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APPENDICES

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1.0 INTRODUCTION

1.1 PURPOSE

This book presents specifications and guidelines relating to the connection and use of natural gas supplied from National Grid facilities. It contains the minimum acceptable standards for gas piping and gas appliance installation necessary to ensure the safe and satisfactory utilization of natural gas by our customers. The information contained herein is intended primarily to assist the installer in the new gas installation process, but it is also intended for use by our customers, by architects and engineers, and finally, by people in various departments at National Grid. It shall be used when a customer's gas installation is new, when a customer is increasing gas usage from a smaller capacity, or when any changes are made from the original installation. It represents a collection of information which will provide for a safe, properly conceived, accurately sized and cost effective installation that will give long lasting, satisfactory service to our customers.

1.2 SCOPE/REFERENCES

The contents of this book apply to installations connecting gas supply system to a customer's premises. We have made it as comprehensive as is practical, within the limits of the intended overview of the subject matter it addresses. The intent of the book is to provide a framework for the subject, not a collection of specific information from various sources. Generally, it refers to several primary documents which form its basis:


b. Massachusetts Fuel Gas Code (248 CMR)

1.3 EXCLUSIONS; RETROACTIVITY

Unless otherwise stated, or as required by the local Inspector, the provisions of this book shall not be applied retroactively to existing installations and/or systems that were in compliance with the Rules and Regulations/Specifications and Requirements in effect at the time of installation. In cases where modifications are being made, those modifications shall be installed to conform to the specifications and requirements of this book or local Codes.

1.4 RESPONSIBILITY

Pursuant to Gas Tariff's, notwithstanding any inspection by National Grid of a customer's equipment or equipment installation or any failure by National Grid to reject an equipment installation, National Grid does not provide any warranty, expressed or implied, as to the adequacy, safety or other characteristics of any structures, equipment, wires, pipes appliances or devices owned, installed or maintained by the customer or leased by the customer from third parties.
2.0 **DEFINITION OF TERMS**

The following definitions of terms used in this book have been assembled from various sources, and have been edited to be meaningful for use in this context and in the gas utility business.

**Accessory:** A device or material used to conduct gas or used in conjunction with an "appliance". In this book, some examples of accessories are valves, thermostats, appliance connectors, pressure regulators, draft hoods and interior house piping.

**AGA:** American Gas Association; an organization made up of most American gas utilities, producers and transporters, which sets standards and disseminates information throughout the gas industry in the interest of bettering industry practices and advancing safety.

**Appliance:** A self-contained device, such as a range or boiler, that converts energy into heat or other useful purpose. In this book, appliance usually relates to furnaces, boilers or water heaters.

**Applicant:** A potential customer.

**Booster:** A centrifugal blower selected to increase gas pressure when the pressure in the gas main at the customer's location is insufficient for a customer's requirements. Boosters are usually required only in industrial or commercial applications. A booster is a machine that is designed to operate on a flat pressure vs. flow curve, which enables it to provide variable flow at an essentially constant pressure. Boosters for natural gas service normally are selected to increase pressure to no more than 28" of water column (W.C.), and are normally furnished hermetically sealed.

**BTU, Btu:** Abbreviation for British Thermal Unit. A Btu is a unit of energy defined as the amount of heat required to raise one pound of water one degree on the Fahrenheit scale, normally from 60 degrees F to 61 degrees F.

**BTUH, Btuh:** Abbreviation for British Thermal Units per hour. Also expressed as Btu/Hr. A standard measure of energy input and output. Typically used in the gas utility industry as a measure of the total, or capacity, of a gas appliance, such as a boiler or a furnace.

**Building:** A structure that stands alone or is separated from adjoining structures by fire walls with all openings therein protected by approved fire doors. In certain applications, a party wall may be required instead of a fire wall.

**CFH, cfh:** Abbreviation for cubic feet per hour. A standard measure of gas flow. Generally understood to mean, and often used interchangeably with, SCFH or Scfh, or standard cubic feet per hour, meaning gas measured at "standard conditions", or 60 degrees Fahrenheit and atmospheric pressure (14.7 psia or 30" mercury absolute). Typically used in the gas utility industry to express gas flow to a customer's premises and through the customer's piping. For gas flowing at the pressures generally used in a customer's premises (about 6" W.C.), flows expressed in cfh can be assumed, for use in calculations such as determining pressure drop in piping and valves, to mean scfh, with a negligible margin of error. (This assumption is not valid for metering and billing calculations where the pressures are corrected back to 7" W. C., or 0.25 pounds per square inch [PSIG].)
Connection Point of Service: That point in the gas service line where responsibility ends and the customer's responsibility begins; or that point where gas service piping ends and customer-owned piping begins. Also known as Connection Point, Connection Point of Gas Service, National Grid/Customer Connection Point of Gas Service, Point of Delivery, Point of Service and Customer Interface. The Connection Point of Service may be located physically at different points in the piping, depending on the meter header configuration used, as defined on Construction Standards.

Construction Standard: A technical instruction, usually a drawing, but often including diagrams and tables, prepared and agreed to within National Grid as a standard method of performing a task, and used for the installation of gas facilities. See Project Manager for a copy of the latest job specific Construction Standard.

Contractor: A licensed/qualified installer of gas utilization equipment and associated piping, ductwork and controls.

Conversion, Gas Conversion: An installation where an appliance originally designed for use with a fuel other than natural gas has been modified to use natural gas, without extensive modifications to the original appliance. A typical gas conversion modifies only the burner of the appliance.

CSA - CSA International - an organization that tests equipment and accessories to insure it is suitable for use in a specific manner or certified to be listed to a specific Standard.

Customer: A user of gas. A customer may be a person, firm, partnership, corporation, association, developer, builder, or governmental agency to whom gas is supplied and billed by National Grid. All National Grid customers are provided, emergency assistance at no charge, covering generic concerns relating to the meter, the gas service, gas odor reports, low or high gas pressure, gas service outages, and other unusual conditions relating to the gas supply.

Residential Customer: A customer supplied by National Grid with gas service at premises used as his/her residence, or a landlord's residence, through a separate meter.

Commercial Customer: A customer supplied by National Grid with gas service at his/her business premises through a separate meter.

Multiple Dwelling Customer: A customer supplied by National Grid with gas service at premises used as his/her residence, but in a multiple dwelling building, normally through a separate meter, but sometimes through a common meter as conditions warrant.

Interruptible Customer: A customer supplied by National Grid with gas service at his/her business premises through a separate meter, that may be interrupted at critical times as agreed to by the contract with National Grid. These customers shall have the capability of burning a second fuel, when the gas service is interrupted.

Temperature Controlled Customer: A customer supplied by National Grid with gas service at his/her business premises through a separate meter, that will be interrupted at an annually pre defined temperature as agreed to by the contract with National
Grid. These customers should have the capability of burning a second fuel, when
the gas service is interrupted.

**Transportation Customer:** Residential or commercial customers who purchase
natural gas directly from a gas supplier, rather than from a utility. The customer
contracts with a gas broker, who arranges monthly with a supplier, a gas pipeline
company and National Grid to have quantities of gas transported directly to him/her
(the customer). Transportation customers are billed both by the gas broker and by
National Grid. The broker's bill reflects the commodity cost, the transportation cost
(interstate pipeline) and the broker's commission.

**Customer Owned Piping:** Is defined as all piping above ground and below ground installed
after the meter. It is the customer’s responsibility to install, test, maintain and keep records of
this piping. Underground cust owned piping – who is respons.

**Dekatherm:** A therm multiplied by 10 (10 therms). A commonly used quantity of gas used
for billing purposes. Also see **therm**.

**Elevated Pressure** Gas supplied to a customer’s equipment at pressures greater than 14” W.C.
(0.50 PSIG).

**Easement:** Right to pass over, occupy or use another's land for the placement and access of
company service facilities.

**Fire Wall:** Similar to a Party Wall in construction, is generally an internal wall. However,
openings, between adjoining areas, such as fire doors, or extensions of facilities, are permitted
in firewalls. Both party walls and firewalls may have different construction requirements
and/or different fire ratings, depending on the type of building. Consult state and local codes
for further clarifications.

**Gas Distribution System, Low Pressure:** Per 220 CMR 101.6: A low pressure distribution
system shall be defined as any system in which the gas pressure in the main is equal or less
than 2 psig. Natural Grid provides 4” w.c. to the outlet of the meter. 1 and 2 psig systems
will require a gas regulator to further reduce the pressure to the house at 6-7” w.c.

**Gas Distribution System, High Pressure:** A gas distribution piping system in which the
pressure is nominally higher than the standard pressure delivered to the customer and therefore
requires a service regulator. Gas distribution system may furnish gas to the customer's service
location at several different pressures, depending on the geographical area served. For the
purposes of this book, high pressure (defined by CMR220) is pressures greater than 60 psig
but equal or less than 200 psig. Intermediate pressure is defined by gas distribution pressures
greater than 2 psig but less than 60 psig.

**Gas Service, Gas Service Line:** A gas service, or gas service line, is the pipe that provides gas
from a gas main in a public area to a customer's building. The gas service is installed and
owned by National Grid in most cases. **Gas service line means the piping, including
associated metering and pressure reducing device(s), that transports gas below grade from a
main to the outside of the building foundation wall where the meter is located outside the
building. If the meter is located inside the building, the service line terminates at the first
accessible fitting inside a wall of the customer's building.** In some specific cases, because of
unique physical conditions, contractor installed, buried, customer-owned piping must be
treated as a gas service, and must therefore be installed in strict accordance with Section 8 of this book.

Gas Technical Lead: The National Grid representative who is the technical contact for the customer when a new installation or a conversion is undertaken.

Installer: See Contractor.

Labeling: “appliances shall be listed and labeled” (no longer MEA required, OTCR (Office of Technical Certification and Research) created to recognize code-prescribed and alternative materials)

Listed: Equipment or material included in a list published by an organization acceptable to National Grid, such as the IAS or Underwriters Laboratories (UL) MEA, and concerned with product evaluation that maintains periodic inspection and evaluation of the production of listed equipment or materials. A typical listing states that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

Low Pressure Service: Gas supplied to a customer from a low pressure gas main.

Meter: The instrument used to measure and indicate and/or record the volume of gas that has been delivered to a customer.

Meter Bar: A specialized item of hardware that functions as a connecting device between the gas service line and the gas meter.

Meter Set: The term used to describe the meter and its related piping and equipment. Often synonymous with meter header, meter installation.

Meter Header: The piping and equipment installed at a customer location relating to and in support of the meter.

Multiple-Family Building: A structure, including row houses, enclosed within exterior walls or fire walls, built, erected and framed of component structural parts, and designed to contain five or more individual dwelling units for permanent residential occupancy.

Multiple Services to a Building - only one service will normally be permitted to a building; a separate building shall consist of either a detached, separate structure, or an attached structure separated from the first structure by a party wall, as defined in the Massachusetts State Uniform Fire Prevention and Building Code. Check code

Nominal: The standard pressure at which National Grid furnishes gas to customers. Nominal pressure depends on the pressure of gas main at a given installation. When served from a high pressure main, nominal pressure is 6" W.C. When served from a low pressure main, nominal pressure can vary from 4.0" W. C. to 9.5" W. C. Nominal pressure is taken to be the pressure measured at the connection point of service. See Section 6.0 of this book for more information.

Party Wall: A party wall shall contain no openings therein. A party wall shall be continuous from the lowest floor level of the building through the roof membrane, and shall terminate in a two foot parapet (except where properly sealed at the roof level). Party walls shall bear the
proper fire rating as per the State Code, and shall be smoke tight at the exterior walls. They shall also be capable of supporting either side of the roof assembly in the event of a collapse.

**Project Manager:** National Grid’s primary contractor liaison for large volume equipment installations. The PM is responsible for many of the new gas equipment installations in the non-Residential (other than 1 to 5 family) markets.

To qualify to be a PM installation the site requires either a new or replacement gas service to be installed, or any added load with a cumulative of 800 cfh or above.

**Regulator:** A device used to reduce the pressure of gas from a higher pressure at its inlet to a lower pressure at its outlet, maintaining that pressure essentially constant, while also controlling the flow of gas; usually mounted directly in gas piping.

**Regulator, Line:** A regulator (see definition above) used on elevated pressure installations (pressures greater than the nominal 6" W.C.), that is mounted in the house line between the service regulator and the appliance regulator, and reduces gas pressure from that elevated pressure to the typical nominal houseline pressure of 6" W.C.

**Regulator, Service:** A regulator that reduces and controls gas main pressure to the pressure of the customer's house line. Usually set by National Grid to supply gas at 6" W. C., gas at a higher pressure can be furnished if the end-using equipment is specified by the manufacturer to require a higher pressure. This regulator is furnished, installed and maintained by National Grid.

**Regulator, Appliance:** A regulator (see definition above) mounted at the appliance, (normally furnished with the appliance) that reduces the house line pressure to the pressure utilized by the appliance.

**School:** A place, public or private, where children or adults gather for educational purposes.

**Security Valve:** A control valve, installed on a meter header, usually for a large load, that is set to close automatically upon sensing one or more gas parameters, usually high and low pressure. A meter header using a security valve is normally designed by National Grid.

**Sediment Trap (drip):** "a tee fitting with a capped nipple in the bottom opening of the run of the tee or other device approved as an effective sediment trap – to collect solid foreign particles to prevent such material from entering close-fitting parts or small passageways (e.g., valves and orifices).

**Service Riser:** (Sweep el) That portion of gas service line where the piping comes out of the ground.

**Tariff:** A compilation of written definitions, statements, rates, rules and regulations that together describe basis for doing business, and that have been approved by the Massachusetts Department of Public Utilities.

**Technical Lead:** See **Gas Technical Lead:**

**Therm:** A unit of heating value equivalent to 100,000 BTUs. Gas is normally billed by the therm, or by the **decatherm,** which is a therm multiplied by 10 (or 10 therms). A cubic foot of gas is generally equal to 1,000 - 1,060 BTUs as supplied by National Grid.
UL: - Underwriters Laboratory - an organization that tests equipment and accessories to insure it is suitable for use in a specific manner or certified to be listed to a specific Standard.

W.C., w.c.: Water column; the standard scale of measurement, expressed in inches of water column, used in the natural gas industry to measure gas pressure. The units of inches of water column (W.C.) are commonly used for pressures below 1 psig. 1 psig = 27.8" W.C. Gas customers are typically furnished natural gas at a pressure of 6" W. C. which is about 1/4 psig.

3.0 GENERAL

3.1 AREA/GEOGRAPHICAL CONSIDERATIONS

The working area of National Grid Energy’s Gas Business Unit encompasses a portion of the State of Massachusetts. The reader is strongly encouraged to check with the village, town, city and governments applicable to his/her installation, to determine if regulation changes have been made, or to determine if any new regulations have been enacted, since the creation of this document.

NOTE

The knowledge of the existence or absence of regulations within a given jurisdiction is the responsibility of the contractor.

3.2 COMMUNICATION / COOPERATION

It is our goal at National Grid to ensure that all of our customers experience safe, trouble-free and dependable gas service. Achievement of this goal begins early in the process of any gas installation. We believe that this can best be accomplished through close cooperation and communication with our customers and their contractors, to assure a quality job, during all phases of the planning and installation of a gas service. Therefore, it is vital that both customer and contractor provide us with preliminary information as early as is feasible in the development of plans for the installation of a new gas service or an increase in gas load. With this information we can ensure that the scheduling of our construction work, meter installation and other service work is appropriate. It will also provide us with an early opportunity to advise customers and contractors if any unique job characteristics exist concerning gas equipment and metering facilities. This kind of communication and cooperation, along with careful adherence to the instructions and specifications in this book, is crucial in preventing delays at any point in a job, and avoids problems that may be difficult to correct later on. We believe that this is the most effective way to ensure complete customer satisfaction with our gas service.

3.3 MEANING OF "SHALL" IN THIS BOOK

When used in this book, the word shall is to be understood to mean that the contractor/customer must comply to the fullest extent with the specification, action or physical requirement described. Failure to comply will result in refusal to provide a meter or connect to our gas system.

3.4 STATE AND LOCAL CODES
The specifications and guidelines in this book are intended to assist a customer in the use of any National, State, City, Town or Village code or ordinance. It is the Contractor's responsibility to be aware of the code requirements for the area of his installation. National Grid does not assume the obligation of enforcing local code requirements.

3.5 INSPECTIONS, CERTIFICATES, PERMITS

If the local jurisdiction where an installation is being planned requires an inspection, a certificate or a permit, it is the owner/contractor’s responsibility to make the appropriate arrangements.

3.6 ACCESS TO CUSTOMERS' PREMISES

National Grid shall have the right of access, at all reasonable times, to all its property installed in or on the customer’s premises. This shall include items such as buried service lines and valves, exposed service lines and valves, gas meters, gas regulators, or gas regulator vents. National Grid shall reserve the right to erect, remove, operate, or maintain our facilities, and to read and test our gas meters on the customer's premises.

3.7 IDENTIFICATION OF EMPLOYEES

Every National Grid employee who is authorized to enter the customer's premises for the purpose of reading or testing meters, investigating odor complaints, or for other purposes, is supplied with an identification card bearing his/her photograph. Employees must, upon request, show their identification cards. If anyone claims to represent the Company and fails to display an identification card upon request, the customer is advised to deny admittance to that individual and to notify both National Grid and the police.

3.8 UNAUTHORIZED CONNECTIONS

National Grid shall have the sole right to make all gas service connections to its gas distribution system.

3.9 SEALS AND TAMPERING DEVICES

No person, except a duly authorized National Grid employee/contractor shall be permitted to break or replace a seal or lock, to alter or change a gas meter or its connections or location, open or alter a meter by-pass valve, or to alter a gas pressure regulator setting.

3.10 DISCONNECTION OF SERVICE

National Grid possesses the sole right to disconnect, remove or reset gas services and/or meters, and to admit gas to any new system of piping or to any old system of piping from which the use of gas has been temporarily discontinued. When installers find it necessary to disconnect a meter or to temporarily shut off the gas, they are required to contact National Grid to arrange scheduling.

3.11 REACTIVATING GAS SERVICE FOLLOWING A WARNING TAG VIOLATION
3.11.1 When National Grid issues a Warning Tag to the customer that involves shutting off the gas supply to an individual appliance and/or a particular section of gas piping due to a hazardous condition, service does not need to be restored by National Grid. Once repaired, gas service may be restored to the affected appliance and/or piping by a licensed qualified contractor and inspected by the local Inspector (if required).

3.11.2 When National Grid issues a Warning Tag that involves the gas supply being shut-off and locked at the meter, the contractor or customer shall notify National Grid that the hazardous condition has been corrected and request that National Grid turn on the gas supply.

3.12 NATIONAL GRID EQUIPMENT ON PRIVATE PROPERTY

All National Grid equipment located on the customer's premises, such as the gas service line, meter, regulators, meter piping, etc., remain National Grid property, and may be removed by National Grid in the event such equipment is no longer needed.

3.13 DEMOLITION

Prior to any demolition of any existing building where gas and/or electric service is installed, the gas and electric must be shut off and the gas service lateral cut by National Grid at the main or property line. No building demolition shall be started until gas meters and regulators have been removed and the gas service has been retired (physically disconnected) by National Grid. Call (866) MYNGRID. 1 (866) 696-4743

3.14 BACK-PRESSURE, AND SUCTION PROTECTION

When the nature of a customer's utilization equipment may induce back-pressure or suction in the piping system carrying gas, suitable protection devices shall be installed and maintained by the customer. The contractor is referred the “Back Pressure Protection Sections” of NFPA 54. National Grid’s representative should be contacted when this application is to be used.

3.15 PROTECTION WHEN COMPRESSED AIR OR OXYGEN CAN ENTER GAS PIPING (including torches and jewelry torches).

Protection is required whenever an installation uses compressed air or oxygen that might accidentally, or for other reasons, cause air or oxygen to enter the gas piping. The contractor is referred to the “Systems Containing Flammable Gas – Air Mixtures” Sections of NFPA 54. Protection devices shall be installed and maintained by the customer, National Grid’s representative should be contacted when this application is to be used.

3.16 ADEQUACY AND SAFETY

*National Grid shall not be required to supply gas service until the customer's installation has been approved by the local authorities having jurisdiction.* National Grid reserves the right to withhold its service or discontinue its service, whenever an installation or part thereof is deemed by National Grid to be unsafe, inadequate or unsuitable for receiving service or interferes with or impairs the continuity or quality of
our service to our customers or to others. An example of a situation where National Grid will refuse service is that in which a piping pressure test shows unacceptable results.

3.17 CODE COMPLIANCE

Gas appliances and gas piping installations on the customer's premises, downstream of National Grid meter assembly, shall be installed in compliance with the minimum safety requirements of the National Fuel Gas Code and Massachusetts Fuel Gas Code (CMR248).

These provisions shall be applicable to new installations and to modifications of existing appliances or systems. Any appliance or system found to be in non-compliance with National Grid standards or other applicable codes shall be subject to the provisions of Warning Tag Procedure (see Definitions, Section 2.0).

3.18 REVISIONS OF THIS BOOK

The information in this book will be periodically revised, updated or amended on-line only as required by industry developments to protect the mutual interest of the customer and National Grid. The printed versions will no longer be available and shall not be referenced any longer. The on-line version will be the only valid issue of the BlueBook.

4.0 NEW GAS SERVICE INSTALLATION PROCESS

4.1 GENERAL

4.1.1 To initiate a new gas installation or to advise National Grid of an additional gas load, call 1-800-732-3400, and a National Grid representative will coordinate your request.

4.1.2 A logical progression of events and requirements for having a new gas service installation is provided in Section 4.2. It is important for contractors and customers to become familiar with this material in order to determine how a new gas service installation or a conversion progresses through the National Grid system.

4.1.3 For any new installation, the customer or his/her contractor shall provide National Grid with verifiable load information including:

- Gas pressure required at service termination point,
- New, existing and future projected loads.

Information provided to National Grid by the customer or his/her contractor regarding a proposed gas installation or an increase in load shall generally be required in writing.

4.1.4 Customers already using gas service from National Grid shall advise the company of any addition or substantial change in his/her equipment, such as increasing a boiler size to accommodate a new building wing or adding a swimming pool heater, or generator, prior to making such additions or changes.
Any requests for equipment requiring manifold pressure greater than 3.5” w.c. must be approved by National Grid before the equipment is purchased. In some instances elevated pressure is not available.

4.1.5 For all new installations, the customer shall be expected to provide, at his/her expense, any and all permits or certificates usually issued by public agencies, that are associated with piping and appurtenances downstream of the meter, as part of the requirements in furnishing gas service downstream of the meter. Any easements required for the job shall also be provided by the customer at his/her expense. Plumbing permits shall be obtained by the plumbing contractor. Customer is responsible to mark out all customer owned buried facilities on private property in vicinity of the proposed gas service/main. Please call 811.

4.1.6 National Grid shall not be obligated to begin construction on the gas service or to supply gas to the customer until:

- The applicant furnishes all necessary permits to National Grid, and easements and/or rights of way are granted;

- The customer's application has been approved by proper officers or duly authorized representatives of the company;

- Necessary payments are made by the applicant;

- The jobsite is deemed safe by the National Grid representative

4.1.7 Prior to the beginning of every job, when the National Grid Representative deems appropriate, meetings will be held as required. At these meetings, the design and construction process will be discussed. The meetings will be arranged so that the various contractors, National Grid Representative and any other relevant representatives will be able to attend.

4.1.8 For residential and smaller commercial jobs, a planned meeting will occur before the job begins, when deemed necessary by the National Grid Representative. For large jobs, the following planned meetings will be held: 1. A "Design" meeting at the planning stage, before many utility locations details have been worked out; and 2. An "Installation" meeting, when excavation is about to begin, and drawings are available. To provide for a well organized and trouble-free job, it is strongly recommended that, as a minimum, the General Contractor, the Plumbing and HVAC contractors attend. National Grid shall coordinate these meetings and contact the appropriate parties. Other meetings will also be encouraged in order to provide for smooth and trouble-free jobs.

CAUTION: CALL BEFORE YOU DIG
All excavators shall be familiar with this Section of Underground Facilities.

Contractors are advised to exercise extreme caution when breaking ground. Before you dig, drill or excavate, be sure that your work area is clear of buried gas pipes or electric cables. An accidental break of these facilities can be dangerous! Telephone the One Call Center at least (3) three working days before you start work. The location of any existing electric buried cable or National Grid buried pipe will be
marked along with telephone, water and cable. The utility will not mark customer-owned buried facilities on private property. Contractors shall not begin any excavation work until all call-backs are made from utility operators contacted as a result of the One Call Center telephone call. If facilities are not marked, DO NOT ASSUME that there are not facilities present in the area. Note that the customer and/or contractor are responsible for marking facilities on private property. If subcontractors are hired, please remind them that they are obligated to call the One Call Center before they do any excavating work.

4.2 REQUIREMENTS FOR HAVING A NEW RESIDENTIAL AND SMALL COMMERCIAL GAS SERVICE INSTALLED

4.2.1 Upon contacting the National Grid Representative, advise if the installation is a residential, commercial or industrial building, and, if you are a builder. The National Grid Representative will determine if gas is available at your location. If gas is available, the National Grid Representative will identify the proper application forms and send them to you along with a packet of relevant information. Residential applicants may initiate the application process by telephone or e-mail. Commercial and industrial customers can also initiate their applications by phone or e-mail.

Please note that if gas is not immediately available in your area, the information in the following sections is not necessarily applicable. A National Grid Representative will explain the process to be used.

4.2.2 The National Grid Representative assigned to you will help determine the Rate and Service Classification most favorable to your current requirements. National Grid does not warrant that the choice will be most favorable to all possible future requirements of any applicant or customer.

4.2.3 The customer is advised that a search will be made regarding the gas history of the premises with National Grid, as well as the history of the individual applicant. If any credit arrears are reported or meter tampering or theft of service is found, it is possible that service could be denied.

4.2.4 Following receipt of a commercial application, the National Grid Representative will schedule a field visit to the location and if the job requires a service only, will determine the preferred meter location with the customer.

4.2.5 National Grid will install the required facilities in accordance with a mutually agreed upon Customer/National Grid Agreement Date. The Gas Marketing and Sales organization will track the installation with the contractor and customer for a timely completion and meter set, assuming all permits have been properly obtained. National Grid will install the gas meter within 10’ of the point of entry.

Note:
The installation schedule is not applicable to gas main installations, but only to residential and small commercial gas services.
4.2.7 It is the contractor's responsibility to obtain any necessary certificates or permits from governing authorities to ensure that a meter is set on the agreed upon date. In addition, it is the contractor's responsibility to arrange for pressure tests.

4.2.8 When an installation requires both gas main and service, the National Grid Representative will sign an application with the customer indicating the date and arrange for field measurements and design of the needed gas facility.

*Note:*

*It is the contractor’s responsibility to arrange a pressure test with the authority having jurisdiction to ensure that a meter is set by the agreed upon date. Pressure tests shall be witnessed by the local agency.*

4.2.9 On conversion from liquid or solid fuels to gas, it is recommended that the chimney should be cleaned and inspected, by the installing contractor and lined according to Code.

5.0 **GAS SERVICE LINE(S)**

5.1 **GAS SERVICE LINE(S) TO A BUILDING OR OTHER GAS USAGE**

5.1.1 National Grid will normally provide only one gas service to a building, unless the need for more than one service is deemed necessary by the National Grid Representative. Depending on the locality, more than one service to a building may require approval from the local authority. See 5.1.3.

5.1.2 If the National Grid Representative determines that more than one gas service is required to supply gas to a building the structure shall be built using party (fire) walls to isolate each area served by a gas service.

5.1.3 In Massachusetts, when more than one gas service is installed in a building, a permanent, weather resistant placard shall be prominently placed near each building entrance point to provide accurate information on the number of services to the fire department when isolation of the gas service is required. It is the contractor's responsibility to provide for the installation of, and the customer's responsibility to maintain, the placard.

5.2 **LOCATION OF GAS SERVICE LINE(S)/LATERAL(S)**

5.2.1 For new construction, National Grid will install gas service piping in areas free of paved driveways or other paved areas. If it becomes necessary to locate a gas service line where it will be under a driveway or walk, the contractor shall not pave the driveway or walk until the gas service line has been installed. Alternately, the customer may opt to install a PVC sleeve. Refer to National Trenching Specifications.

Depth of cover for service lines
a) Service lines shall be installed with 24 inches, but no less than 18 inches of cover below final grade in the street, and 18 inches, but no less than 12 inches of cover on private property.
b) If an underground structure prevents installation at the aforementioned depths, the installation shall be designed to withstand any anticipated external load.

<table>
<thead>
<tr>
<th>Service</th>
<th>Cover In Roadway</th>
<th>Minimum depth of cover in Roadway</th>
<th>Cover in Private Property</th>
<th>Minimum Cover on Private Property</th>
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<tr>
<td>Depth of cover</td>
<td>24”</td>
<td>18”</td>
<td>18”</td>
<td>12”</td>
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5.2.2 The contractor shall notify the National Grid Representative as early as possible of any such paving as indicated in Section 5.3.1.

5.2.3 A new gas service line shall not be installed under or through buildings.

5.2.4 National Grid shall designate the exact location of the meter and service riser on the exterior of the building.

5.2.5 Any change requested by the customer to the location of an existing service line, if approved by National Grid, shall be made at the expense of the customer. The customer shall be responsible for hiring a contractor to install gas house line piping and/or interconnections with facilities.

5.3 **SERVICE ENTRANCE TO EXISTING BUILDINGS**

5.3.1 For exceptions where meter are to be installed inside and the service enters the building underground through a poured concrete wall, a sleeve for the gas service shall be installed by the builder during construction. The National Grid Representative shall designate the size and location of the sleeve.

5.3.2 Service Entry to Existing Buildings - Where an inside meter location has been selected, the gas service entry point below grade shall be enclosed in a protective pipe sleeve following specification. The boring of the entrance hole, excavation, installing the sleeve and, sealing of the space between the sleeve and gas piping, shall be the responsibility of National Grid.

5.4 **RESTORATION ON PRIVATE PROPERTY**

5.4.1 For private property an agreement will be made before work begins on the restoration of the property. The amount of restoration performed by National Grid will be determined on a case by case basis.

6.0 **GAS PRESSURE**

6.1 **NOMINAL METER OUTLET PRESSURE WHEN SERVED FROM HIGH PRESSURE DISTRIBUTION SYSTEM**

6.1.1 On the high pressure portion of its distribution systems, where a service regulator is installed in conjunction with the gas meter, National Grid provides gas to customers at a nominal pressure of 6” W.C. The nominal pressure is
measured immediately downstream of gas meter or service regulator, whichever is further downstream.

6.1.2 **Operating/Running** pressure at the meter or regulator outlet typically can be as high as 7" W.C. or as low as 5" W.C. and can vary slightly for each installation depending on load diversity, pressure drops through the meter set piping, service regulator performance, and pressure drop through the gas meter.

6.1.3 When purchasing gas utilization equipment to operate on gas from high pressure distribution system, it is recommended that equipment be chosen to function effectively based on a nominal pressure of 5" W.C. at the outlet of the meter or service regulator, whichever is further downstream. This does not take into account the effect of pressure losses of house piping.

**NOTE**

*It is National Grid’s policy, whenever practicable, to deliver the minimum meter outlet pressure to meet the requirements of the customer’s gas utilization equipment to ensure safe, efficient operation of all properly adjusted appliances. In all cases, National Grid has the sole responsibility for the determination of which gas distribution system, low pressure or high pressure, will supply the approved load and what gas pressure can be supplied.*

6.2 METER OUTLET PRESSURE WHEN SERVED FROM NATIONAL GRID’S LOW PRESSURE DISTRIBUTION SYSTEM

On the low pressure portion of its distribution systems, where no service regulator is installed, National Grid provides gas to customers at the front wall (point of entry) of pressure that can vary between 4" and 9.5" W.C. **When purchasing gas utilization equipment to operate on gas from low pressure distribution system, it is recommended that the equipment be chosen which requires no more than 3.5” W.C. manifold pressure at the burner.**

6.3 PRESSURE AND CONTRACTOR

The contractor shall ensure that the customer's house line and all associated interconnecting piping into the system are properly sized to prevent excessive pressure losses at the gas utilization equipment. The contractor must also ensure that the customer's installed gas utilization equipment is compatible with the available nominal gas pressure. Contractors are advised that the gas pressure available at the inlet of the manufacturer's burner gas train (before the appliance regulator) will be equal to the pressure at the gas meter outlet MINUS the pressure drop in the customer owned gas piping system.

6.4 ELEVATED METER OUTLET PRESSURE ON HIGH PRESSURE DISTRIBUTION SYSTEM

6.4.1 In certain instances, such as with industrial processing or commercial equipment, there may be a need for gas pressure higher than nominal 7" W.C. at the meter.
Elevated pressures are not available throughout the entire service territory, thus all requests for elevated pressure must be approved in advance by the National Grid Representative.

6.4.2 Request for elevated delivery pressure will not be approved for the purpose of downsizing the customer’s piping.

6.4.3 If the customer needs elevated pressure because of gas utilization equipment requirements, the customer or customer's contractor shall provide the appropriate information in writing to support the elevated pressure request. This information shall be submitted to National Grid as soon as possible for evaluation and approval.

6.4.4 Along with the customer's application, the customer shall provide National Grid with the manufacturer's specifications for the gas utilization equipment. The literature furnished shall provide an explanation of the need for elevated gas pressure requirements. Upon verification of the equipment pressure requirement, if the above acceptance criteria are met and the National Grid gas system at the location can supply the elevated pressure, National Grid will furnish gas to accommodate the higher pressure need.

6.4.5 Under certain conditions where the customer's load requirements and gas utilization equipment qualify, National Grid will discuss with the customer the availability of supplying line pressure where there is no service regulator at the meter header. In these cases, the customer is advised that the gas pressure would vary nominally with any variations in high pressure gas distribution system.

6.5 ELEVATED METER OUTLET PRESSURE ON LOW PRESSURE DISTRIBUTION SYSTEM

In certain geographical locations, only low pressure gas is available via gas distribution system. In these areas, if elevated meter outlet pressure is required, a gas booster may be necessary. Contact the National Grid Representative for details. Installations shall be approved by National Grid and be in compliance with NFPA 54 and Massachusetts State Fuel Gas Code 248-CMR-5.05: 5.5.1.1. See CS-MET013 for details of low pressure switch.

6.6 LOCAL CODES RELATING TO ELEVATED GAS PRESSURES

When gas pressure greater than the nominal 7” W.C. is required, the code requirements of the prevailing jurisdiction shall also be met. Contractors shall be familiar with these codes and obtain any necessary approvals from regulating agencies before submitting the application to National Grid.

7.0 METERS AND REGULATORS

7.1 PREREQUISITES AND NOTIFICATIONS FOR NEW GAS METERS

An Inspection Tag shall be required as a prerequisite before National Grid will install a new meter and turn on the gas supply to the customer.

7.2 METER SET LOCATION REQUIREMENTS
7.2.1 All new meter sets shall be located on the outside of any building unless it is impractical or unsafe.

7.2.2 All meter sets shall be installed following the clearance requirements indicated in the appropriate Construction Standard. For information on distances of windows and openings from gas meters and vents refer to Venting of Service Regulator Standard attached in Appendix A.

7.2.3 Outside and inside gas shut-off valves shall be readily accessible at all times to National Grid and emergency service personnel and shall not be covered or obstructed.

7.2.4 The installation of meter sets in driveways, under windows, under building overhangs or near fresh air intakes should be avoided where practical. In those cases where the regulator vent cannot be located to meet clearance requirements, National Grid shall be responsible for installing regulator vent piping according to Appendix A.

7.2.5 Meter set locations shall be sufficiently removed or separated from the bottom termination of a stairway so as not to constitute a hazard. When required distances cannot be maintained, such as for buildings with limited width, the contractor shall be required to provide suitable protection.

7.2.6 Outdoor and indoor meter set locations that may be exposed to vehicular or other equipment damage shall be avoided unless no other feasible location exists. If one or more of the criteria in Section 7.6 of this book are met, protection posts shall be required. National Grid, or the contractor installing the service shall provide protection posts protecting the service at the time the riser is installed. The customer will supply and install all protection posts to protect all piping downstream of the riser. Protection posts are to be installed per National Grid Construction Standard MTRS6060.

7.2.7 Meter sets shall not be installed below ground in vaults.

7.2.8 The metering of large quantities of gas or the installation of meter sets and regulators in schools, commercial buildings or industrial buildings, including multiple meter headers, may require meter rooms, or special construction or piping. Consultants and installers of such facilities are advised to consult with National Grid Representative in preparing for the upcoming installation.

7.2.9 Although it is not desirable and should be avoided, gas meters may be placed under windows provided that the following conditions are met:

− No other suitable location is available

− Proper regulator venting is provided

7.3 INSTALLATION AND INTERCONNECTION REQUIREMENT
The meter header shall be installed according to the National Grid construction standard. The most commonly used construction standards are included in this document.

**NOTE**

To avoid delays and possible at visits to the site, it is critical that the contractor adhere to the space dimensions specified between meter connections. Consult the appropriate Construction Standard for these dimensions prior to the start of construction.

7.3.2 National Grid will supply and install all meter headers to the outlet side of the meter.

7.3.3 National Grid will supply and install, at the time of meter installation, the meter swivels, nuts, bolts, and gaskets required to connect the meter to the meter header.

7.3.4 In those cases where National Grid installs the meter header, the contractor shall be responsible for houseline interconnections with facilities. The installation of the regulator vent and/or relief valve vent piping will be done by National Grid.

7.3.5 In certain installations, usually for horizontal meter headers or very large volume customers where standard construction drawings do not exist, the meter header will be custom designed by National Grid. Site specific drawings will be furnished for that particular installation through the National Grid Representative.

7.3.6 Piping and fittings used on outside meter sets shall be welded and painted steel pipe, or screwed and painted black pipe. See Section 8.0 of this book for piping requirements regarding materials, coatings and construction.

7.3.7 The customer's pipe connecting to the meter header shall be installed and supported following the NFPA 54 requirements, and the Massachusetts Fuel Gas Code.

7.3.8 Prior to requesting a meter installation, the contractor shall be responsible for the installation of plugs or caps on any open ended pipe or fittings on customer house line to prevent entry of dirt and debris ensuring the integrity of the gas piping system.

7.4. INDOOR METER SET REQUIREMENTS

7.4.1 Meter sets shall be approved for indoor installation only when, in judgement, an outdoor installation is impractical or unsafe. Special approval may be needed by the National Grid Representative.

7.4.2 Indoor meters shall be installed according to the National Grid Construction Standards and written specifications provided by National Grid.

**NOTE**
In cases where the service regulator must be installed inside the building, the service regulator and meter shall be located immediately downstream of the exposed service line valve.

7.5 MULTIPLE METER HEADER REQUIREMENT

The meter header piping shall be adequately sized and shall be properly supported according to the National Grid Construction Standard.

7.6 METER SET PROTECTION REQUIREMENT

7.6.1 When a customer cannot provide either an indoor or outdoor location for meters, regulators and associated piping that is free from the possibility of vehicular, equipment or other physical damage. National Grid will install any posts required to protect the gas riser and meter header.

7.6.2 In areas where vandalism might be anticipated, a protected meter area may be required, or meters may need to be protected by a suitable wire fence if specified by National Grid.

7.6.3 It is the position that, when the specifications established in National Grid Construction Standard MTRS6060 (see Appendix G) are not followed, National Grid will not set the new meter until adequate protection is provided.

7.7 METER HEADER PAD REQUIREMENTS FOR LARGE GAS INSTALLATIONS

The customer shall be responsible for the installation of a concrete gas meter pad for all rotary and turbine meter installations where a meter pad is required. Meter pads are required to support the weight of the meter and its associated gas header piping, valves and in some cases the weight of gas house line interconnection piping.

7.8 WALLS TO SUPPORT METER HEADER REQUIREMENTS

In cases where National Grid Construction Standards shows meter set piping supported by a wall, a wall shall be constructed to support the meter set if one does not already exist. In some cases, where a wall does not exist, a horizontal meter set may be specified instead if space requirements are adequate.

7.9 RELOCATION OF GAS METER SETS

7.9.1 Gas meter relocation, such as moving a meter from one outdoor location to another outdoor location, or from an inside location to an outdoor location, shall be performed at the customer's expense. It is National Grid policy to avoid moving any inside meter to another inside location, or an outside location to an inside location unless no other feasible location can be reasonably found.

7.9.2 To request meter relocation, contact National Grid at 1-781 907-3960. A representative will schedule a field visit by National Grid who oversees the design, policy requirements, field measurements and scheduling.
7.9.3 Contractors performing the relocation of the customer owned-piping shall be responsible for:

- Interconnection of piping with the National Grid piping at the connection point of service
- Providing proper meter header protection, if needed;
- Obtaining necessary piping permits from local authorities.

7.10 GAS SERVICE REGULATOR AND VENTING REQUIREMENTS

7.10.1 National Grid will select, furnish, install and adjust all service regulators when the gas is supplied by high pressure gas distribution system.

7.10.2 All service regulator vent piping and related components shall be installed according to NFPA-54 and Manufacturer’s installation instructions and recommendations of National Grid.

7.10.3 METER SETS:
Service regulator vent piping shall be sized according to Appendix A of this book or NFPA-54. On all large jobs the contractor shall not size or determine the termination locations of regulator and relief valve vents without the assistance of National Grid’s representative.

All service regulators and relief valves requiring vent lines shall terminate within 10’ of the meter header and regulator. National Grid will then tie in the vent piping to the regulator.

7.10.4 All vent lines on shall have an insulating fitting installed as close to the service regulator or relief valve as practical.

7.10.5 All vent lines installations shall be equipped with an approved insect and rain resistant cap on the terminal end.

7.10.6 Service regulator vents shall not be covered over, plugged up, or otherwise obstructed.

7.10.7 Termination locations of regulator or relief valve vents shall be protected from damage caused by submergence in areas where flooding or ice accumulation may occur. National Grid will advise the contractor of vent terminus requirements for all locations that deviate from established requirements in the construction standards. In areas where frequent flooding occurs, the vent shall terminate above the high-water mark.

7.10.8 The lengths of vent run and number of fittings shall be kept to a minimum. It will be necessary to increase the pipe size of the vent piping when long runs cannot be avoided. Appendix A shall be consulted to decide appropriate vent sizes and other information on service regulator venting.

7.11 METER BYPASS REQUIREMENTS
National Grid will specify a meter bypass piping arrangement as part of the appropriate construction standard or design.

**7.12 TELEMETERING INSTALLATION REQUIREMENTS**

7.12.1 Customers with Interruptible service shall be remotely monitored using telemetering equipment. This requirement may result in additional cost to the customer.

7.12.2 The customer shall be responsible for the installation of a dedicated, voice-grade telephone line routed to a location designated by the National Grid Representative, terminating with an appropriate network interface.

7.12.3 The customer shall be responsible for any trenching, drilling, conduits, restoration, supports, etc. that may be required to reach the National Grid telemetering device.

7.12.4 National Grid will install the interconnecting cable between the customer-provided interface and the telemetering device.

**7.13 METER INSTALLATION, PURGING AND RELIGHTING**

7.13.1 For commercial, industrial and multi-meter installations that add loads requiring increased meter or regulator size where National Grid is required to shut down the existing gas service, the contractor may be required to purge air from the customer owned piping system and to relight all gas utilization equipment affected by the shutdown.

7.13.2 For all commercial new meter sets, the installing contractor shall be responsible for purging the house line and for starting up the equipment.

7.13.3 For residential new meter sets, National Grid will purge the gas piping system and light all operating gas appliances (except house high efficiency heating equipment) at the time of the new meter set. Appliances that are not ready for operation at the time of the meter set shall be started up by the installing contractor.

7.13.4 Where the gas service is turned off for Company purposes, National Grid will be responsible for the turning off all affected appliances, performing an integrity test of the gas piping system prior to the turning on and gassing in, and relighting all affected appliances.

7.13.5 For new meter sets serving large input gas utilization equipment, the burner installer shall be responsible for purging as per NFPA 54 instructions.

**7.14 PILOT GAS SUPPLY FOR INTERRUPTIBLE RATE CUSTOMERS**

7.14.1 Interruptible customers who do not have an existing firm rate meter supplying a gas pilot may not be required to have a separate firm rate meter for the purpose of supplying the pilot as long as National Grid determines that installing a separate pilot gas supply line is impractical.
7.14.2 For new installations requiring a separate gas pilot supply line, the pilot gas supply shall be supplied by a firm rate gas meter.

8.0 CUSTOMER-OWNED GAS PIPING SYSTEMS

8.1 GENERAL

8.1.1 Before proceeding with the design and installation of gas piping systems, contractors are advised to refer to the National Fuel Gas Code (NFPA 54). It is strongly recommended that a review of the local plumbing requirements also be performed to ensure that the proposed installation is in compliance with local codes. In Massachusetts, contractors are required to refer to 248 CMR 5.00 amendment to NFPA 54.

8.1.2 When a new appliance or other gas load is added to an existing gas piping system, the contractor/customer shall verify the capacity of the existing piping for adequacy according to the capacity table(s) in NFPA 54. If necessary, existing gas piping shall be replaced with larger piping or additional piping installed that also conforms to the NFPA 54 capacity tables. Per 248 CMR, all low pressure piping shall be designed using a maximum pressure drop of 0.5” w.c.

8.1.3 The customer shall not be permitted to use an abandoned service line as a houseline.

8.1.4 For customer-owned gas piping installations that meet the definition of a gas service, the contractor shall perform an acceptance test to verify the condition of the cathodic protection measures installed, where the type of piping warrants such protection. This test, which shall be performed after installation of the pipe and prior to setting of the meter, only indicates the condition of the cathodic protection at the time of testing. Any corrective action required by virtue of the test results shall be the contractor’s responsibility.

8.1.5 Gas Pipe Bonding: “Each above ground portion of a gas piping system that is likely to become energized shall be electrically continuous and bonded to an effective ground fault current path. Gas piping shall be considered to be bonded where it is connected to gas utilization equipment that is connected to the equipment grounding conductor of the current supplying that equipment”.

8.2 PIPE SIZING

8.2.1 All gas piping, including trunk and branch lines, shall be adequately sized according to the National Fuel Gas Code.

8.2.2 It is the policy to standardize on the use of NFPA 54 and the Massachusetts Fuel Gas Code when offering technical assistance for sizing gas pipe operating at pressures less than 1 psig.

8.2.3 The allowable pressure drop in house piping where gas is supplied by low pressure gas distribution system, as measured from the meter outlet to the inlet of the gas appliance, under maximum expected flow conditions shall not exceed 0.5” w.c.
8.2.4 For sizing a houseline, whether it is connected to a National Grid high pressure or low pressure main, contractors are advised that the length of house piping to be used in sizing the pipe shall be measured from the connection point of service to the desired usage point.

8.2.5 A diversity factor (see the Massachusetts Fuel Gas Code 248 CMR 5.04 (2)) shall be used to determine the maximum gas consumption for commercial and industrial establishments and in multiple tenant buildings where several appliances or loads are supplied from a common gas pipe line. In these cases, using a diversity factor in sizing the piping can result in significant savings in houseline and meter header costs. These factors can involve some complexity. For example, surveys have shown that different usages affect the load patterns where ranges are used, but range usage does not affect heating load patterns.

8.2.6 For many typical cases (such as the standard residential combination of a boiler, a water heater and a range), a valid indication of whether the house piping system is sized properly is a series of pressure measurements taken immediately upstream of each appliance with all appliances operating.

For multiple appliance or load situations, such as apartment buildings or industrial complexes with many different loads, this criterion will not hold true because of the effect of diversity factors.

8.3 PIPING DRAWING

8.3.1 For buried customer-owned piping installations such as a remote meter location, it is mandatory that a piping drawing or plan be provided to a National Grid Representative for review and approval prior to starting work on a job. This drawing shall indicate the proposed location, sizes of each branch, the various loads, connection point or service, cathodic protection measures, piping material and joining methods. It is especially important that the piping location information provided be accurate. At the end of the job, an as-built version of this drawing shall be submitted to National Grid prior to the acceptance of the job.

8.4 GAS PIPING MATERIALS

8.4.1 GENERAL

Materials used for gas piping shall be selected according to the provisions of NFPA 54, 248 CMR 5.05.

8.4.2 GAS PIPING MATERIALS, INDOORS

For indoor gas piping, materials used shall be one or a combination of the following, complying with the latest ANSI standards for steel pipe, ANSI B36.10:

- Bare steel of standard weight (Schedule 40) with screwed or welded joints. ASTM A53 continuous weld pipe shall be used as a minimum.
- Galvanized steel is not permitted.

- Threaded gas fittings for steel pipe shall be 150 pound, malleable iron, forged steel, black iron.

- **Plastic** pipe of any type is **prohibited** for indoor use.

- **Cast iron** pipe is **prohibited** under any circumstances.

- **Corrugated Stainless Steel Tubing**: For natural gas piping inside and outside buildings, a recently developed system of piping Corrugated Stainless Steel Tubing (CSST) has been recognized by the National Fuel Gas Code since 1988, and is becoming more popular outside the service territory. This technology provides another option for gas piping in addition to steel pipe. It is to be used where permitted by local codes. See Appendix C for CSST piping in all other areas of Massachusetts.

**NOTE**

*Contractors are advised to exercise extreme caution when choosing to use CSST on an installation since some jurisdictions may not yet have approved this piping option. Contractors and builders interested in learning more about this economically favorable alternative are strongly encouraged to review the relevant sections in NFPA-54.*

**8.4.3 GAS PIPING MATERIALS, OUTDOORS, ABOVE GROUND**

- For piping outdoors, above ground, including regulator vent piping, **properly coated black iron pipe** with screwed joints shall be used, unless welded joints are required. If steel pipe with welded joints is required, ASTM A53 continuous weld pipe shall be used as a minimum, but ASTM A106 is recommended. Where permitted, plain steel pipe may be used with screwed ends. In this case, the minimum material selected shall be ASTM A53 continuous weld pipe as well.

- **Cast iron pipe** is **not permitted** under any circumstances.

**8.4.4 GAS PIPING MATERIALS, BELOW GROUND, GENERAL**

For buried customer-owned gas piping applications, only materials approved and installed by NFPA 54, and the Massachusetts Fuel Gas Code are acceptable.

**8.4.5 GAS PIPING BELOW GROUND, PLASTIC PIPE OPTION**

Polyethylene (PE) pipe or tubing PE 2406 (medium density yellow) or PE 3408 (high density black) conforming to ASTM D2513, Specifications for Thermoplastic Gas Pressure Pipe Systems, shall be used.

PE plastic pipe may **not** be used for gas piping inside or beneath buildings, or for venting gas pressure regulators.

The following specifications shall be used for PE fittings:
- ASTM D2683 Specification for Socket Type Polyethylene Fittings for Outside Diameter Controlled PE Pipe and Tubing
- ASTM D3261 Specification for Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
- ASTM F1055 Standard Specification for Electrofusion Type PE Fittings for Outside Diameter Controlled PE Pipe and Tubing

**NOTE:**

All PE pipe, tubing and fittings are normally marked by the manufacturers with the appropriate ASTM code-indicating conformance to the specified standards.

Installation requirements and details for plastic piping are provided in Section 8.12

### TABLE 8.1

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SDR RATING</th>
<th>WALL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” CTS</td>
<td>SDR 7</td>
<td>.090”</td>
</tr>
<tr>
<td>1” CTS</td>
<td>SDR 11.5</td>
<td>.099”</td>
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<tr>
<td>1 ¼”</td>
<td>SDR 10</td>
<td>.166”</td>
</tr>
<tr>
<td>2”</td>
<td>SDR 11</td>
<td>.216”</td>
</tr>
</tbody>
</table>

#### 8.5 VALVES

8.5.1 Listed, design-certified manual shut-off valves shall be used as main shut-offs for gas appliance installations according to the requirements in NFPA-54, and the Massachusetts Fuel Gas Code

**CAUTION**

NEVER - FOR ANY REASON - remove the core nut from a gas valve, or attempt to disassemble a valve stem when the gas pressure is on.

#### 8.6 STEEL GAS PIPING, WELDING REQUIREMENTS

8.6.1 **GENERAL**

When welded construction is used, above or below ground, indoors or outdoors, welders shall be certified by recognized certification and testing agencies for pipeline welding in accordance with API 1104 or ASME Section IX. Written welding procedures shall be followed to ensure the acceptability of field welds. Welders' certifications shall be available at the construction site.
8.6.2 RESIDENTIAL, COMMERCIAL, INDUSTRIAL, MULTI-FAMILY INSTALLATIONS IN MASSACHUSETTS

The maximum design/operating pressure for gas piping systems located inside buildings shall not exceed 1/2 psig unless: 1. Approved by NFPA 54, and the Massachusetts Fuel Gas Code. 2. The piping system is welded and one or more of the following conditions are met:

- The piping is located in a ventilated chase or otherwise enclosed for protection against accidental gas accumulation.
- The piping is located inside buildings or separate areas of buildings used exclusively for:
  - Industrial processing or heating,
  - Research,
  - Warehousing, or
  - Boiler or mechanical equipment rooms.

8.6.3 TESTING REQUIREMENTS OF PIPING AFTER THE METER
The pressure test of all piping shall be in accordance with 248 CMR Section 5.08

8.6.4 WELDER QUALIFICATIONS
All Welders shall be qualified in accordance with 248 CMR Section 5.03

8.7 GAS PIPING (INDOORS AND OUTDOORS) ABOVE GROUND, INSTALLATION REQUIREMENTS, GENERAL

8.7.1 Gas piping in concealed locations shall be installed according to the requirements in NFPA-54 and the Massachusetts Fuel Gas Code. If it is desired to locate concealed gas piping in partitions, piping shall be located in hollow partitions, such as in ventilated chases. Concealed piping in solid partitions is prohibited.

8.7.2 Gas piping inside or outside of any building shall not be run in or through an air-duct, clothing chute, chimney or flue, ventilating duct, dumb waiter or elevator shaft.

8.7.3 No other piping or wiring shall be located in a casing containing a gas line.

8.7.4 Gas lines passing through concrete or masonry floor slabs shall be enclosed by a sleeve or thimble.

8.7.5 Gas piping extending through foundation walls below grade shall be sleeved and sealed according to the requirements in NFPA-54 and the Massachusetts Fuel Gas Code.
8.7.6 The use of gas piping as a grounding electrode is prohibited. Underground gas piping shall be insulated electrically where it connects to piping within the building.

8.7.7 Sediment traps for gas piping shall be installed according to the requirements in NFPA-54 and the Massachusetts Fuel Gas Code. When not incorporated as part of the equipment, a sediment trap shall be installed downstream of the equipment shut-off valve (exception: dryers, ranges, outdoor grills and illuminating appliances).

8.7.8 Where a branch outlet is placed on a main supply line before it is known what size pipe will be connected to it, the outlet shall be of the same size as the line that supplies it.

8.7.9 Shutoff valves controlling several gas piping systems shall be accessible for operation and shall be installed so as to be protected from any physical damage. Gas shutoff valves shall be plainly marked with a metal tag by the installer so that each piping system supplied by the valve can be readily identified.

8.7.10 Gas piping shall not be supported by other piping but shall be supported directly by the building structure itself with pipe hooks, metal straps, bands, or hangers suitable for the size of the pipe, and of proper strength and quality at proper intervals so that the piping cannot be jarred or displaced accidentally from its original position.

8.7.11 Listed and approved flexible connectors shall meet the requirements of NFPA54 and local Codes. They are to be used for final connections to gas appliances provided the flexible connectors are used on moveable equipment such as gas dryers and gas ranges only, and are placed on the appliance side of the appliance shut-off valve. Certain manufacturers of selected equipment supply flexible connectors for permanent mounted gas utilization equipment. In those cases, the manufacturer's specified flexible connectors shall be installed according to the manufacturer's installation instructions and the Massachusetts Fuel Gas Code.

8.7.12 Flexible connectors shall not pass through floors or partitions.

8.7.13 For steel gas piping installed outdoors above ground, piping shall be protected with a suitable oil based painting system, or by use of one of the coating systems identified in Section 8.9 of this book.

8.8 GAS PIPING OUTDOORS, BELOW GROUND, INSTALLATION REQUIREMENTS

8.8.1 Buried gas piping to meet the requirements of NFPA 54. These concerns are critical because underground conditions promote corrosion. In order to comply with these laws, the materials and rules in the following sections are provided to ensure that gas piping meets the required standards.

8.8.2 For underground piping, mark-out procedures shall be strictly followed during construction according to the provisions of federal regulations in 49 CFR Parts 192. Prior to excavation, National Grid or its representative will mark out all gas facilities in the public right-of-way. The customer is responsible to
mark out all Customer Owned gas and other utilities located on their private property. The number to call to get the facilities marked out is 811.

8.8.3 Only personnel qualified to perform the specific pipe-joining processes used for any given installation, such as welding for steel and heat fusion for plastic, shall perform this work.

8.8.4 Remote meter sets and meter pads present unique problems. These meters are normally limited to commercial and industrial facilities where multiple buildings are supplied gas from a single meter set location. There are, however, some applications where National Grid requires that a meter be installed remotely from a building due to the inability to locate the meter inside or directly near the building. For these cases, the meter sets are, where practical, installed as close to buildings as possible so that customer piping need not be buried.

8.8.5 Customer-owned gas piping shall enter buildings above grade wherever possible to avoid the additional expense of cathodic protection requirements.

8.8.6 All piping below ground shall be installed with a minimum of 18 inches of ground cover on the public right-of-way and 12” on private property. It is recommended that a clearance of 6 inches from other sub-surface facilities or materials be maintained.

8.8.7 Where steel pipe is used, below grade piping and fittings shall be fully coated and cathodically protected according to NFPA54.

8.8.8 Back fill around pipe shall consist of loose dirt or sand, must be free of rocks, building materials or other debris.

8.8.9 Where plastic pipe is used (where code permits), connections between metallic and plastic pipe shall be made (below grade) only with fittings approved by the pipe manufacturer. Information concerning these fittings can be obtained by contacting National Grid. The recommended ways to make this transition connection are:

Use of an approved service riser assembly;

- Use of an approved transition fitting. These fittings are couplings that have been tested and approved by National Grid based on their ability to resist longitudinal pullout forces.

8.8.10 All piping shall be pressure tested according to Massachusetts Fuel Gas Code.

8.9 PLASTIC PIPING, INSTALLATION REQUIREMENTS (Where allowed by Code)

8.9.1 Massachusetts state code requires that plastic pipe and fittings shall be installed by qualified personnel according to the manufacturer's written installation instructions.

8.9.2 Before using materials, visually inspect for damage such as gouges, scratches and kinks, and discard any damaged materials.
8.9.3 PE pipe and tubing must be laid on undisturbed or well-compacted soil or other continuous support. Suitable rock-free back-fill shall always be placed around the pipe or tubing.

8.9.4 In addition to the minimum depth of coverage, consideration must be given to future loading and activity above and around the piping to determine if encasing the pipe in a steel sleeve is necessary.

8.9.5 Pneumatic or mechanical tamping shall not be used within 12" of the plastic piping.

8.9.6 Pipe or tubing must be free of cuts and scratches deeper than 10% of the wall thickness. Defects in pipe, tubing or fittings cannot be repaired. Therefore, the damaged pipe, tubing or fittings must be replaced. PE pipe shall not be used inside buildings or above ground.

8.9.7 PE pipe and tubing shall be joined by heat fusion or by mechanical fittings (mechanical service head adapters).

8.9.8 Any pipe size greater than 4” of any pipe operating greater than 5 psig shall be welded. The preferred joining method is an all fused plastic system (electrofusion or butt fusion). PE mechanical stab and full restrained (locking) compression fittings (made for natural gas) are permitted as approved by National Grid. If a metallic mechanical fitting is used as a last resort, the mechanical coupling shall be cathodically protected from corrosion by industry approved field coating and the installation of a 3# anode.

8.9.9 Heat fusion joints shall be made according to the manufacturer's recommended heat fusion procedures.

8.9.10 Miter joints are not permitted.

8.9.11 Joints shall not be located in pipe bends.

8.9.12 See the pipe manufacturer’s requirements for minimum bending radius of plastic pipe.

8.9.13 Heat fusion joints shall be performed only by personnel qualified in the appropriate joining techniques.

8.9.14 A #14 AWG, minimum, insulated solid copper wire shall be installed alongside but not touching the plastic pipe to facilitate locating with a pipe locator. Tracer wires should terminate in an accessible location above ground so that a pipe locator can be connected.

8.9.15 A bright-colored plastic warning tape shall be buried approximately 12” below grade and directly above the plastic pipe to mark the location of the pipe and to warn future excavators.

8.9.16 Insulating couplings or fittings shall be used to electrically separate the underground portion of plastic piping from the above-ground steel piping or the
piping in a building. This is necessary to protect the gas riser, and also is necessary for anodeless, pre-coated riser.

8.10 STEEL GAS PIPING, CORROSION PROTECTION REQUIREMENTS, INSULATING JOINTS

8.10.1 Insulating couplings or fittings shall be used to electrically separate the underground portion of steel piping from the above-ground piping or the piping in a building. The insulators shall be located on the above ground portion of a riser and on the pipe immediately after entering a building wall. No other connections shall be made to the underground portion of piping that could result in an electrical ground to the piping, since this will cause the insulators to be ineffective. Insulating unions, threaded or insulating couplings, or insulating flanges are typically used for these connections. Insulated compression couplings, weld end couplings shall be used on outdoor installations only.

8.11 STEEL GAS PIPING, CORROSION PROTECTION REQUIREMENTS, MAGNESIUM ANODES

8.11.1 Magnesium anodes shall be electrically attached to the underground steel piping using a thermite welded (often called “cadweld”) connection. These anodes are available in 3 pound and 17 pound ingot sizes with a wire connection lead attached.

8.11.2 17 pound magnesium anodes should be installed on all underground piping at a spacing of 96 inches apart for new construction, 48” for maintenance installations. The wire leads can be piggy backed or connected to a header cable. All metal connections must be coated. If the gas pipe does not come above grade the anode wires or header cable must be connected to a test wire in a test station. Anodes must be removed from the paper bag and should be saturated with water after they are backfilled. For electrically continuous sections of piping more than 1000 feet long between insulators, a test station and 4-17lb anodes should be installed every 1000 linear feet.

8.11.3 The anode ingot shall be buried in the soil approximately 1 foot to the side and 1 foot below the level of the piping at a location near the center of the section pipe being protected if less than 1000 feet, or every 1000 linear feet for longer sections of piping. Vertically installed anodes should have at least 50% of the total anode length buried below the bottom of the piping.

8.11.4 The wire lead shall be attached to a clean, shiny, bare steel area of the pipe using a thermite weld kit. After attaching, the coating in the thermite-welded area shall be restored (re-coated) so that no bare metal remains.

8.12 GAS PIPING THROUGH BUILDING WALLS, ABOVE OR BELOW GROUND, INSTALLATION REQUIREMENTS

8.12.1 That portion of customer-owned outdoor steel gas piping, above ground that runs through an external building wall (the wall piece) shall be coated or wrapped using one of the coating and taping systems listed in Section 8.10 of this book. This requirement shall be applicable to all steel pipe, including black
pipe, and to piping above ground that runs through walls. **PVC tape is not acceptable for wrapping pipe for this purpose.**

8.12.2 For wall penetrations below ground, refer to the appropriate National Grid drawing for installation requirements and details. Note that a sleeve is required for this application.

9.0 **GAS UTILIZATION EQUIPMENT**

9.1 **GENERAL**

9.1.1 **APPLIANCES- ACCESSORIES AND EQUIPMENT APPROVAL**

All of the gas appliances and accessories that National Grid services, and referred to in this book shall be design-certified by a nationally recognized testing and/or listing agency, such as **CSA** or Underwriters Laboratories, **M.E.A.**, to comply with the applicable American National Standard and approved by the Massachusetts Plumbing Board.

9.1.2 **CO ALARMS**

Carbon Monoxide (CO) is a highly toxic gas. It is the product of incomplete combustion of fossil fuels such as oil, natural gas, propane, gasoline, wood and coal. CO is very dangerous because it is colorless, odorless and tasteless.

Massachusetts Codes require the installation of CO Alarms in all new and existing 1 and 2 family houses, apartment buildings, hotels dormitories, nursing homes and schools, where fossil fuel burning furnaces or boilers are installed.

National Grid recommends the installation of CO Alarms in all areas and recommends annual maintenance of the heating system.

9.1.3 **ASSEMBLY OF EQUIPMENT**

The installing contractor shall assemble the equipment according to the installation instructions of the manufacturer.

9.1.4 **GAS UTILIZATION EQUIPMENT INSTALLED IN RESIDENTIAL GARAGES**

Gas utilization equipment installed in residential garages and in adjacent spaces that open to the garage and are not part of the living space or dwelling unit, shall be installed so that all burners and burner ignition devices are located at a minimum of 18” above the floor unless the equipment is listed as “Flammable Vapor Ignition Resistant” per NFPA-54.

9.2 **NATIONAL GRID “NATURAL GAS PRESSURE, IGNITION & DRAFT TEST”**

On new gas meter installations National Grid will perform a natural gas pressure test (lock up & run), and an ignition and draft test, where applicable, on **new** natural gas
utilization equipment; however, it is up to the installing contractor to insure the equipment meets the manufacturer’s installation guidelines.

9.3 INSTALLATION OF HEAT PRODUCING EQUIPMENT IN FLAMMABLE OR CORROSIVE ATMOSPHERES

9.3.1 In operations where there is use of flammable liquids or agents, or aerosol sprays using halogenated hydrocarbons such as carbon tetrachloride, special care shall be taken in the installation of heat-producing equipment. Flammable liquids clearly must be kept a significant distance away from gas burning flames for safety reasons. Not so apparent, however, halogenated hydrocarbons tend to break down in temperatures above 500 degrees F and form toxic fumes. These fumes are extremely corrosive and will accelerate damage to heat-producing equipment, flues and exposed metal surfaces. Refer to NFPA 54 for installations.

9.3.2 It is imperative that all air for combustion come from out-of-doors in environments of this nature, unless the equipment can be isolated from the contaminated atmosphere.

9.4 GAS CONVERSIONS AND CONVERSION BURNER REQUIREMENTS

9.4.1 Conversion burners and associated equipment for gas conversions shall be installed according to the burner manufacturer’s installation instructions, NFPA-54 and ANSI Z21.8.

9.4.2 Burner flame shall not impinge upon any surface or obstruction in the combustion chamber. The heating contractor shall place the burner in the combustion chamber so that the burner head is centered.

9.4.3 When installing conversion equipment, the combustion chamber and flue passage ways of the existing appliance shall be thoroughly cleaned.

9.4.4 Conversion burner nozzle shall not extend into combustion chamber.

9.4.5 Combustion chamber shall be installed on dry-base boiler if upshot gas burner is not used.

9.4.6 Burners shall be adequately supported, i.e., burner legs shall be required, or burner shall be resting on a firm and level foundation, where applicable.

9.4.7 Burners shall be properly attached to boiler flange.

9.4.8 Unit shall be inspected and tested for gas tightness. All openings around the boiler base at floor level, doors and at gun entrance shall be properly sealed with masonry cement or equivalent to prevent air leakage into the boiler. Clean outs and burner blast tube, except fire door, shall be sealed with non-asbestos type furnace cement.

9.4.9 Unless otherwise specified by the burner manufacturer, always install a gas designed double-acting barometric draft regulator in the vent connector. Gas
designed barometric draft regulators shall be installed according to manufacturer’s installation instructions (power burner only).

A manual reset or single use type thermally actuated spill switch shall be installed on the double-acting barometric draft regulator. This switch is wired into the burner circuit to shut the gas off in case of a sustained back draft or blocked chimney condition.

9.4.10 Stack switches or stack aquastats shall be removed from electric circuit so they do not function as operating gas controls.

9.4.11 Base of chimney shall be cleaned, and the chimney wire brushed from top to bottom. If not properly cleaned, oil residue left on the gas vent will dry out over time, flake off, and drop downward, possibly building up to cause a blocked chimney condition.

9.4.12 Vent connector shall be properly sized. Check the existing vent connector size against the proposed firing rate of the gas burner to determine if the vent connector is too big or small. Replace the vent connector if its size does not correspond with the vent tables in NFPA-54.

9.4.13 Contractors are advised that gas conversion burners are not delivered adjusted for proper input and combustion air. Therefore, appropriate adjustments shall be made to ensure proper draft, proper CO readings and other items necessary for safe operation.

9.5 GAS FIREPLACES (VENTED DECORATIVE GAS APPLIANCES)

9.5.1 In all cases, these appliances shall be installed according to applicable state codes, the manufacturer's installation instructions and other specific conditions of approval.

9.5.2 Existing masonry fireplace flues must first be investigated and determined to be adequate, unobstructed, and with no upper-story openings or connections. All applicable clearances, air for combustion and ventilation requirements shall be observed.

9.5.3 Approved factory-built fireplaces, where installed indoors, must be vented through an approved Type B vent or lined chimney. All applicable clearances, air for combustion and ventilation requirements shall be observed.

9.6 UNVENTED ROOM HEATERS
Unvented room heaters shall be tested in accordance with ANSI Z21.5.2 and shall be installed in accordance with NFPA 54, and the manufacturers installation instructions. They may not be used as the primary heat source. Unvented room heaters must be equipped with an oxygen depletion sensor safety shutoff system.

9.7 OTHER EQUIPMENT
9.8 COMBO WATER HEATERS

Water heaters utilized both to supply potable hot water and provide hot water for space heating applications shall be listed and labeled for such applications by the manufacturer and shall be installed in accordance with the manufacturer's installation instructions and Massachusetts Fuel Gas Code.
APPENDIX A
APPENDIX A

SERVICE REGULATOR VENT PIPING REQUIREMENTS

1.0 Contractors shall size and lay out service regulator vent piping in accordance with the following requirements:

1.1 Vent lines for gas pressure service regulators shall be piped using rigid steel Schedule 40 pipe, sized in accordance with Tables 2 through 7 of this Appendix, and installed in accordance with the National Grid Construction Standard SERV-6225 and the instructions contained in this Appendix. All service regulator vent lines shall be located such that, should venting to the atmosphere occur, a hazard is not created.

1.2 Vent piping installed outdoors shall be galvanized or primed and painted with screwed ends. For those cases where vent pipe is installed with welded end connections, the pipe shall be primed and coated with a painting system suitable for outdoor applications. Vent piping installed through outside walls shall be protected against corrosion in accordance with the requirements contained in Section 8.0 of this book.

1.3 Where there is more than one service regulator or relief valve at a meter header location, each regulator shall have its own separate vent line to the outdoors. Manifolding of vent lines shall not be permitted.

1.4 Regulators shall not be vented commonly with external relief valves or devices requiring atmospheric air pressure to balance a diaphragm.

1.5 National Grid Technical Lead will provide size and termination location, as part of the installation design when vent lines are required. The contractor shall furnish the labor, materials and the layout for the installation of the regulator vent line.

1.6 The size of service regulator vent lines shall not be less than the size of the connection on the regulator vent.

1.7 All vent lines shall have an insulating union installed as close to the regulator as possible. The insulating union will be provided by National Grid.

1.8 Vent line termination points shall be provided with approved rain caps and insect-resistant screens. National Grid shall furnish the contractor with these combination rain caps and insect-resistant screen devices at the construction site meeting with the installing contractor. The contractor shall provide the labor to install the devices. Combination vent caps are available for the following pipe sizes as shown in Table 1.
TABLE 1

NATIONAL GRID COMBINATION VENT CAPS

<table>
<thead>
<tr>
<th>NATIONAL GRID ITEM ID</th>
<th>VENT PIPE DIAMETER</th>
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</thead>
<tbody>
<tr>
<td>9358637</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>9358640</td>
<td>1&quot;</td>
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<tr>
<td>9358639</td>
<td>1-1/4&quot;</td>
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<tr>
<td>9358636</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

1.9 Vent line piping shall contain a minimum number of bends and elbows. Each fitting offers resistance to gas flow, that can be expressed as an equivalent length of pipe. Equivalent lengths for elbows are given underneath each table in Tables 2 through 7 of this Appendix. The equivalent length of the fittings shall be added to the actual length of piping when selecting vent pipe size.

1.10 Where vent pipe size in the tables is larger than the regulator vent outlet, a pipe reducer (increaser) shall be installed as close to the regulator vent as possible, preferably immediately at the regulator vent outlet.

1.11 Vent piping is not permitted to be installed below-grade. If it penetrates a building foundation wall above ground, the piping shall meet the same requirements as buried gas piping regarding corrosion protection, i.e., coating, wrapping, cathodic protection, etc. in accordance with the Section 8.0 of this book.

1.12 Regulator vent piping for outdoor regulators shall only be required to clear a building overhang or to provide the required clearances above the ground, or away from building openings or windows. Clearance for a given installation shall be as specified in the National Grid construction standards.

1.13 For Tables 2 through 7 which follow, the maximum length of vent pipe and number of fittings allowed in each case shall not be exceeded under any circumstances.
APPENDIX B
# HARD CASE DIAPHRAM METERS

(For Indoor and Outdoor Applications)

<table>
<thead>
<tr>
<th>Meter Class</th>
<th>METER TYPE</th>
<th>Manuf.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E 1</th>
<th>E 2</th>
<th>REF DRAWING</th>
<th>WALL-CNTR SWIVL SIZE</th>
<th>SWIVL SIZE</th>
<th>PIPE SIZE</th>
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<td>Metris 250TC</td>
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<td>-</td>
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<td>-</td>
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<td>7</td>
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<td>-</td>
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<td>7</td>
<td>20 LT</td>
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<td>400ATC (30-Lt)</td>
<td>Sprague</td>
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**NOTE:** Meter class "400": NYC has 30-Lt connections
Long Island has 45-Lt connections
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<td>27 3/4</td>
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</table>

Meters may be installed in a horizontal or vertical position. Vertical (top inlet) is preferred. Check for "Arrow" to indicating proper flow direction. If applicable, a restricting orifice should be installed at least 2 or 4 pipe diameters downstream of the meter. Before installing, remove plastic end caps and check for free rotation of impellers. Do not put meter under strain at inlet and outlet flange connections and apply no more than 80 FT-LBS of torque when tightening flange bolts. Add oil to all 3 oil reservoirs to the center of the oil level indicator. "Do Not Overfill."
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APPENDIX C
MASS. CSST CODE RULING

Enacted February 4, 2009

1. WHEREAS, Corrugated Stainless Steel Tubing (“CSST”) is subject to nearby (a.k.a. indirect) lightning strikes causing electrical arcing which can rupture CSST products leading to property damage and potential injuries or death;

2. WHEREAS, without prior approval by the Board of State Examiners of Plumbers and Gas Fitters (“Board”), it appears manufacturer installation requirements have been changed to require adherence to additional bonding requirements which has now been addressed in NFPA 54, 2009 edition (not adopted in Massachusetts) and given that the Board has not previously approved a CSST product with special lightning protection installation provisions;

3. WHEREAS, certain CSST manufacturers have informed the Board that, when applicable, the additional bonding of CSST piping must be performed by licensed electricians because the new bonding requirements are an enhanced version of bonding required to protect buildings from ground faults, which fall within the purview of electricians and given that these manufacturers previously acknowledged that the additional bonding may not be authorized in Massachusetts, or in the alternative, if authorized, may not be enforceable in Massachusetts by any relevant authorities;

4. WHEREAS, based on the limited information before it that the additional bonding was required for public safety, the Board temporarily rescinded product approval for CSST piping on November 26, 2008 to allow for resolution of the enforcement/requirement of extra bonding by the relevant authorities having jurisdiction;

5. WHEREAS, on January 16, 2009, the Board of Fire Prevention Regulations issued an interpretation finding that additional bonding required by manufacturers would not violate the Massachusetts Electrical Code but made no statement on the enforceability of said requirements.

Now, therefore, the Board, after due consideration and in conjunction with meetings held with the manufacturers, immediately reinstates the previously approved CSST products in Massachusetts pursuant to these provisions;

A. The Board typically requires products to meet national standards for assurances that they are safe for public use; however, the Board has been unable to identify any national standard for protection of CSST piping (or any piping in general) from indirect lightning strikes. Therefore, pending the adoption of such a standard, and, solely based on evidence provided by manufacturers, the Board accepts the following measures as mitigation for damages from indirect lightning strikes:

1. Direct Bonding of CSST piping – Manufacturers have provided evidence from a testing center, Lightning Technologies Inc. of Pittsfield, Massachusetts, that additional bonding of CSST products via a bonding jumper helps mitigate damages from indirect lightning strikes.
2. One other manufacturer, OmegaFlex, has also provided evidence from Lightning Technologies Inc. of Pittsfield, Massachusetts, that its product, also mitigates the damages from indirect lightning strikes due in part to a special jacket material.

B. Using a bonding jumper with CSST falls outside the scope of plumbing and gas fitting, therefore plumbers cannot be required or otherwise held responsible for adhering to manufacturer’s instructions regarding such bonding (be it direct or other types covered by the electrical code). It appears that licensed electricians, adhering to the regulations/codes adopted by the Board of Fire Prevention Regulations, have exclusive jurisdiction over the additional CSST bonding. Therefore, if the manufacturer’s instructions require use of a bonding jumper, then such work shall be done in accordance with applicable law, which includes the pulling of any required electrical permits.

C. Instructions from manufacturers often reference adherence to the “latest edition” of NFPA 54 which is ambiguous. As the 2009 edition requires a type of direct bonding, the Board, via this policy, places the burden on manufacturers to clarify whether such bonding will be required for that particular product.

D. The Board is adopting this policy based on manufacturer representations that their efforts at mitigating indirect lightning strikes are effective. Should the Board receive evidence to the contrary, or a new standard be adopted which the manufacturer’s do not adhere to, the Board reserves the right to reconsider this policy as well as past and future product approvals, to the extent allowed by law and in the best interests of public safety.

E. Like all other plumbing and gas products, manufacturers must seek Board approval prior to making any other changes to their installation instructions. New CSST products will be similarly reviewed to ensure that steps have been taken to mitigate the effects of indirect lightning strikes.

F. It shall be the duty of manufacturer’s to educate their Massachusetts installers of the above provisions as soon as possible.
APPENDIX D
Instructions for the Cutting/Burning and Welding Applications

All fields on applications must be **CORRECTLY AND COMPLETELY FILLED OUT;**

- Incomplete or incorrect application(s) will be returned by mail only.
- Areas that are either incorrect or incomplete will be hi-lighted and if necessary a written explanation will accompany a returned application(s).
- To ensure accuracy when resubmitting the corrected application(s) resubmit the hi-lighted application with your corrections on it.
- Correctly completed applications take 3 – 5 business days for processing and approval review.
- Phone calls on the status of the application should only be made if the application has been in Fire Prevention for more than 1 week.
- When the application is approved the customer will be called for pick – up if it is unpaid or pick-up was requested at time of submittal. Due to volume of permits issued, a permit requested for pick-up is only held in Fire Prevention for 1 business day, after which it is automatically mailed out.
- If pick-up was not requested upon approval it will be automatically mailed out.
- Reason for work being performed must also be include on the “TO CONDUCT THE FOLLOWING” line on all applications. There are **NO EXCEPTIONS.**

**Permission Letter**

All applications for Cutting/Burning/ Welding must be accompanied with a permission letter from the property owner, manager, or agent at the time of submittal, there are **NO EXCEPTIONS.** Permission Letters must be submitted:

- on letterhead,
- must be dated,
- specify the exact work location (street address and number),
- list the name of every contractor performing cutting/burning/ and welding work on the property,
- list all floors where work is being performed, a floor and area must be individually listed. **“ALL FLOORS” IS NOT ACCEPTABLE AND THERE ARE NO EXCEPTIONS**
- if the work is being performed in certain area(s) like the basement or the roof, the letter must specify these locations and the reason why the work is being performed
- reason for the work being performed must be in all letters
- signed by property owner/agent/manager

**Emergency Work**

If the job is an emergency **THE APPLICATION AND THE LETTER MUST STATE THIS.** An emergency relates to items such as:

- no heat in the winter,
- no water or hot water,
- no air-conditioning in the summer,
- unusable handicapped facilities or
- unsafe conditions.

A job that is time or fiscally sensitive on either the contractor’s or property owners’ part does not constitute an emergency. It must be a life safety issue.

**Paid Details**

Only upon approval will it be known as to whether a Paid Detail will be required. An instruction sheet will be attached to the permit in order for a Paid Detail to be ordered. **PERMIT NUMBERS WILL NOT BE GIVEN OUT IN ADVANCE; THE PERMIT MUST BE IN CONTRACTOR’S HAND IN ORDER FOR PAID DETAIL TO BE ORDERED.**

**Extensions**

The maximum time allowable under the law for this permit is six months. When requesting an extension your original permit with the request can be either faxed or hand delivered at least 2 weeks prior to its expiration. As long as the scope of work has not changed, permit has not expired, and the permission letter is acceptable it will be automatically extended. If the above is not the case it is a totally new application and all of the above is required.

**Note:** It is the contractor’s responsibility to make copies and maintain original permit. All original permits must be posted and maintained on job-site. If lost, a copy may be requested, but will only be available **by pick-up** in Fire Prevention. **Faxed Permits are never valid.**
APPLICATION FOR CUTTING-BURNING-WELDING PERMIT

STARTING DATE __________________________  ENDING DATE __________________________

(6 MONTH MAXIMUM)

JOB LOCATION______________________________________________________________
______________________________________________________________________________

BUILDING OWNER’S NAME___________________________________________________

BUILDING OWNER’S ADDRESS_______________________________________________
Number   Street
PHONE
City  State  Zip Code
______________________________________________________________________________

CONTRACTOR’S NAME_______________________________________________________

CONTRACTOR’S ADDRESS___________________________________________________
Number   Street
PHONE
City  State  Zip Code

TO CONDUCT THE FOLLOWING______________________________________________
______________________________________________________________________________

INDICATE WHAT FLOORS OR AREAS ARE INVOLVED_________________________
______________________________________________________________________________

Acetylene: Tanks____ @ c.f.____ = _____  Liquid Oxygen: Tanks____ @ c.f.____ = _____
Acetylene: (B) Tanks____ @ c.f.____ = _____  Mapp Gas: Tanks____ @ c.f.____ = _____
Argon: Tanks____ @ c.f.____ = _____  Oxygen: Tanks____ @ c.f.____ = _____
CO2: Tanks____ @ c.f.____ = _____  Propane: Tanks____ @ c.f.____ = _____
# of Torches: __________________________  # of Welders: __________________________

APPLICANT’S NAME (PRINT)_________________________________________________

APPLICANT’S SIGNATURE________________________________DATE______________

*PLEASE NOTE: You must obtain a release letter from the owner or management company stating the dates and floors you will be working on in accordance with CMR 39.
APPENDIX E
Guideline to Ensure a Successful Gas Meter Set

- Gas Meter Header has been kept plumb and square
- Final grade is recommended at a clearance of 6” to the bottom of the meter
- Gas regulator vent maintains 18” minimum height from grade
- Gas regulator vent meets 18” clearance requirements from windows, doors, other openings into the building
- Gas regulator vent maintains a minimum of 10’ from any mechanical air intakes
- Gas regulator vent terminus maintains 3’ from any source of ignition
- Gas regulator vent and meter header maintains a minimum of 12” horizontally from any electric meter pans or electric meters
- Electric meters meet clearance requirements and are not installed directly above the gas regulator or meter header
- Electric meter has been installed and the dwelling is powered up
- Customer owned piping has been sleeved or properly cold wrapped for protection if going through a masonry wall
- Multiple meter header has been properly secured to the wall
- Multiple meter headers have had ID tags installed identifying the units locations
- Protection posts shall be installed to code if required to prevent vehicular damage
- Make up air requirements meet combustion needs
- Blue Card must be on site from Town Inspector
- All customer owned piping is installed to National Grids Blue Book requirements and meets Mass. Plumbing Code CMR2478 and NFPA Fuel Codes
- National Grid has access to the dwelling to install meter and fire one piece of equipment to obtain Lock Up and Running Pressures

GAS METER SET APPOINTMENT CONTACT NUMBER
1-800-732-3400
### LINKS TO VARIOUS MANUFACTURES:

#### HEATING MANUFACTURERS

| **AMERICAN STANDARD** |
| **AO SMITH** |
| **BAXI BOILERS** |
| **BOSCH** |
| **BUDERUS** |
| **BURNHAM** |
| **CARLIN** |
| **CARRIER** |
| **EMERSON** |
| **HONEYWELL CONTROLS** |
| **MIDCO ECONOMITE** |
| **MODINE** |
| **PEERLESS BOILERS** |
| **POWER FLAME BURNERS** |
| **REZNOR UNIT HEATERS** |
| **RHEEM** |
| **SLANT FIN** |
| **TAKAGI** |
| **TECHTANIUM** |
| **TRANE** |
| **TRIANGLE TUBE BOILERS** |
| **TURBO MAX** |
| **UTICA BOILERS** |
| **WALLHUNG BOILERS** |
| **WEIL-MCLAIN** |

#### CSST MANUFACTURERS

| **GASTITE** |
| **OMEGAFLEX TRAC PIPE COUNTER STRIKE** |
| **WARDFLEX** |

#### GAS REGULATORS

| **ELSTER AMERICAN - HONEYWELL** |
| **EMERSON / FISHER** |
| **ITRON** |
| **PIETRO FIORENTINI** |
APPENDIX  G
PREFERRED INSTALLATIONS:

- **DRYER VENT**
  - 18" MINIMUM
  - 18" PREFERRED / 12" MIN. SEE NOTES

- **ELECTRICAL METER**
  - (NOT A SOURCE OF IGNITION)
  - 12" MIN. SEE NOTE 2

- **CENTRAL A/C UNIT OR GENERATOR OR OTHER SOURCE OF IGNITION**
  - 36" MINIMUM
  - 36" MINIMUM TO SOURCE OF IGNITION
  - 36" MIN. (WHERE PRACTICAL) SEE NOTE 3
  - 36" PREFERRED / 18" MIN.

---

**REGULATOR VENT AND METER CLEARANCES FOR OUTDOOR LOCATION**

<table>
<thead>
<tr>
<th>ALL REGIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVISED CLEARANCES TO ELECTRIC METER AND WINDOWS</td>
</tr>
<tr>
<td>REMOVED FLOOD LEVEL DISTANCE</td>
</tr>
</tbody>
</table>

**Key Changes:**

- DATE: 07/15/2010
- EFFECTIVE DATE: 9/15/2016
- DESIGN: PAUL GUGLIOTTA
- STD. DWG. NO.: 020013-CS
- DRAWN: PAUL GUGLIOTTA
## GUIDELINES FOR NON-PREFERRED INSTALLATIONS:

<table>
<thead>
<tr>
<th>#</th>
<th>ITEM</th>
<th>SIZE</th>
<th>ITEM ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>PIPE SLEEVE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SEALING COMPOUND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>VENT ASSEMBLY, WITH RAIN &amp; INSECT RESISTANT SCREEN</td>
<td>3/4&quot; 1&quot; 1-1/4&quot; 1-1/2&quot; 2&quot;</td>
<td>9358637 9358640 9358636 9358641 9358636</td>
</tr>
</tbody>
</table>

## SERVICE REGULATOR VENT RESTRICTIONS

**NOTE:** THIS 18" CLEARANCE FROM REGULATOR VENT TO WINDOW ONLY APPLIES TO OPERABLE WINDOWS. THIS RULE DOES NOT APPLY TO WINDOWS THAT CAN'T BE OPENED PER MFR. DESIGN.

**SEE NOTE 4 FOR VENT PIPING INSTALLATION**

**18" MINIMUM**

**SEE NOTE 7 FOR VENTING PIPING FACING UP**

**18" MINIMUM**

**METER SETS LOCATED UNDER THE WINDOW SHOULD BE AVOIDED**

**SEE NOTE 3 FOR VENTING PIPING FACING UP**

**6" MINIMUM VERTICAL CLEARANCE FROM WINDOW**

**18" PREFERRED* 12" MIN.**

**OUTSIDE GRADE**

**CONC. OR BRICK WALL**

**WALL VENT**

**ROOF VENT OR CONC. SLAB**

**18" PREFERRED* 12" MIN.**

**SEE NOTE 3**

---

**EFFECTIVE DATE:** 9/15/2016

**020013-CS**

**PAGE 2 of 6**
1. A regulator vent cannot be located under an overhang that can trap gas such as a pitched awning with sides. A vent may be located under a flat surface horizontal overhang under 6’ in length as long as the overhang has no openings into the building within 18 inches of the vent terminus.

2. A gas meter must have a minimum of 12’ horizontal clearance distance from a standard electric meter on new construction. For relocations, 12’ clearance should be met, where practical.

3. The gas regulator vent terminus must: have a minimum clearance of 36” radial distance (where practical) and 12’ minimal horizontal distance from a standard electric meter. If the regulator vent is less than 36” radial clearance of the electric meter, the vent should be piped away from the electric meter to a distance of at least 36”. If field conditions prevent the 36” clearance from being met, it can be reduced to 12” pending approval from National Grid area supervisor.

4. The outside terminal of each service regulator vent must: have a rain and insect resistant screen • Be located at a place where any venting gas can escape freely into atmosphere • Be away from any windows, doors, soffit vents or any openings where gas can enter the building. Maintain a minimum of 18 inches horizontal clearance if that opening is with vertically of the vent terminus. Windows that are designed by manufacturer not to open are exempt from the 18 inch rule. Ventless regulators are exempt from this distance requirement as they limit the release of gas to < 1 cubic ft./hour • Be protected from damage where ice accumulation may occur • It is preferred that regulator vents be installed at a height 18 inches above grade, however, the minimum allowable vent height shall be 12 inches above final grade.

5. The meter assembly shall be located to prevent damage by vehicles and mechanical equipment. Where this is not practical, additional protection shall be installed. See MTR-6090.

6. Galvanized pipe and fittings for vent piping is preferred (required on L.I.). Properly coated black iron pipe is permitted.

7. If a vent needs to be extended, straight piping is preferred, but if not practical, a vent line “trap” is acceptable • On outside meter sets, a union or coupling is recommended on all short runs of vent lines (approximately 3’ and less). For longer vent lines approximately 3’ and greater, unions or couplings are required (insulating type preferred). This is required so the regulator can be removed without cutting or dis-assemblying the vent piping. • On all inside sets, an insulating union or insulated coupling is required on the vent piping. This insulated union or insulated coupling shall be located as close to the regulator as possible.

8. It is preferred that the meter and riser not be located under a window.

9. Vent lines should be installed above grade. Below grade vent lines should be avoided. However, where it is not possible, vent lines installed underground shall be protected from corroding. This includes wrapping the entire line with approved coating per 030031-CS, installing a 3 lb bag anode (item ID 939401) (or larger) and installing an insulating fitting between the regulator and the below grade section (typically inside the building). Any new vent line that passes through a concrete or masonry wall or foundation, shall be sleeved and the annular space shall be sealed to prevent water intrusion. For situations that are not covered by the provisions of this standard, contact gas engineering.

10. On large residential, commercial and industrial sets where large forced air intake systems are present, engineering approval is required for regulator/relief valve termination points.

11. On existing installations where underground vent line is found, the vent line should be relocated above ground. If this is not possible, it must be pressure tested at 3 psi and inspected for corrosion. If it passes the pressure test and the pipe is visually acceptable, it then shall be cathodically protected per 030031-CS and brought in to compliance as described in Note 9.

<table>
<thead>
<tr>
<th>CLEARANCE GUIDELINES:</th>
<th>MINIMUM DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Electric Meter (not considered a source of ignition)</td>
<td>FROM GAS METER TO ELECTRIC METER: 12 INCHES HORIZONTAL FROM REGULATOR VENT TERMINUS TO ELECTRIC METER: 36” RADIAL DISTANCE WHERE PRACTICAL, IF NOT PIPE VENT TO 36”. IF THIS CAN NOT BE ACHIEVED, DISTANCE CAN BE REDUCED TO 12” PENDING N.G. SUPERVISOR’S APPROVAL</td>
</tr>
<tr>
<td>Ignition Source</td>
<td>36 INCHES RECOMMENDED / 18 INCHES MINIMUM FROM GAS METER AND 36 INCHES MINIMUM DISTANCE FROM REGULATOR VENT TERMINUS TO SOURCE OF IGNITION (PER NATIONAL FUEL GAS CODE 5.8.5.1)</td>
</tr>
<tr>
<td>Operable Windows, Door, Soffit Vent, Other Openings into Building</td>
<td>18 INCHES HORIZONTAL AND 6 FEET VERTICAL (WHERE PRACTICAL) FROM REGULATOR VENT TERMINUS</td>
</tr>
<tr>
<td>Vent Terminus under flat overhang</td>
<td>IF OVERhang protruding less than 6 feet vent terminus is acceptable under overhang.</td>
</tr>
<tr>
<td>Central Air Unit (considered a source of ignition)</td>
<td>36 INCHES PREFERRED / 18 INCHES MINIMUM FROM GAS METER</td>
</tr>
<tr>
<td>Vent Terminus under awning/canopy with sides enclosed</td>
<td>18 INCHES HORIZONTAL</td>
</tr>
<tr>
<td>Forcéd air intake large residential, commercial or industrial</td>
<td>Requires engineering approval</td>
</tr>
<tr>
<td>Vent Terminus clearance above final grade</td>
<td>18 INCHES PREFERRED / 12 INCHES MINIMUM</td>
</tr>
<tr>
<td>Vent Terminus clearance above known flood line</td>
<td>18 INCHES PREFERRED / 12 INCHES MINIMUM</td>
</tr>
<tr>
<td>Vent Terminus to a category 1 direct vent heater</td>
<td>3 FEET FROM INTAKE OR EXHAUST OR PER MFG’R. SPECS. WHICHEVER IS GREATER</td>
</tr>
<tr>
<td>Vent Terminus to sewer vent</td>
<td>18 INCHES RECOMMENDED</td>
</tr>
</tbody>
</table>

*Definition of preferred / recommended / should: indicates best practice and is the action that is expected to be performed as described unless there is a compelling reason not to do so.
RECOMMENDED VENT LINE EXTENSION

NOTES:
1. VENT LINE MUST BE GAS TIGHT. USE APPROPRIATE THREAD SEALANT.
2. PLACING THE REGULATOR VENT IN THE UP POSITION AND RUNNING THE VENT LINE STRAIGHT UP CAN CAUSE WATER AND ICE TO ACCUMULATE INSIDE THE REGULATOR. THE CONFIGURATION SHOWN HERE MINIMIZES THE CHANCE OF WATER INSIDE THE REGULATOR.
3. USE GALVANIZED PIPE AND FITTINGS IN LONG ISLAND.
4. DRESSER STYLE 90 CAN BE USED IN LIEU OF UNION. (INSULATING TYPE PREFERRED)

PECK VENT

STRAP TO WALL

3" MIN / 6" MAX

6" MIN / 12" MAX

UNION OR CPLNG

CAP

6" - 12" MIN. ABOVE FINAL GRADE SHOULD BE MET
RECOMMENDED EXTENSIONS FOR HORIZONTAL VENT OUTLETS

- Strap to wall
- 6" max.
- Union
- 6" min.
- 12" max.

GRADE
PREFABRICATION NOTES FOR ITEMS 1-11

E. ALL WELDING MUST CONFORM TO API-1104 PROCEDURES.
F. ALL PIPING SHALL BE TESTED AT 90 PSIG MINIMUM FOR 5 MINUTES
G. 10% OF THE WELDS SHALL BE RADIOGRAPHED PER API-1104 OR PER NATIONAL GRID’S WELDING POLICY PROCEDURES.
H. ALL OPEN END FLANGE OPENINGS SHALL BE COVERED WITH PLASTIC CAPS.
I. ASSEMBLY SHALL BE SUPPLIED IN 4 PIECES (3 PIPING & 1 FOR SUPPORT).
K. PIPING SHALL CONFORM TO NATIONAL GRID SPECIFICATION 120020-MS.

BILL OF MATERIAL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SAP ITEM ID UNY, RI</th>
<th>QTY</th>
<th>MATERIAL NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>PREFabRICATIONED ITEMS 1 – 10 LISTED BELOW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FLANGE 2” WELD NECK FLAT FACE CLASS 150#</td>
<td>9341058</td>
<td>1</td>
<td>PER ASTM A-105 GR. B OR A-350 LF-2</td>
</tr>
<tr>
<td>2</td>
<td>TEE 3”, WELD END STD. WALL PER A-234 WPB</td>
<td>9342465</td>
<td>2</td>
<td>STANDARD WALL, PER A-234 WPB</td>
</tr>
<tr>
<td>3</td>
<td>ELBOW 3” WELD END 90 DEG. LONG RADIUS</td>
<td>9341216</td>
<td>3</td>
<td>PER A-106 GR. B</td>
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<tr>
<td>4</td>
<td>PIPE 3” STEEL, STD. WALL (SCH. 40)</td>
<td>9340918</td>
<td>5’</td>
<td>PER A-105 GRADE B</td>
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<tr>
<td>5</td>
<td>THRED-O-LET ½’X3’PIPE 3000#</td>
<td>9341652</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>NIPPLE ½’X3’ LONG</td>
<td>9340631</td>
<td>2</td>
<td></td>
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<tr>
<td>7</td>
<td>VALVE ½” LOCKWING, TAMPER PROOF</td>
<td>9339593</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>PLUG ½” SOLID STEEL OR C.I.</td>
<td>9340912</td>
<td>3</td>
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<tr>
<td>9</td>
<td>FLANGE 3” WELD NECK FLAT FACE CLASS 150#</td>
<td>9341388</td>
<td>9</td>
<td>PER ASTM A-105 GR. B OR A-350 LF-2</td>
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<tr>
<td>10</td>
<td>REDUCER 3” X 2” CONC., STD. WALL, WELD END OR PREFabricRATED COMPLETED COMPONENTS</td>
<td>9342651</td>
<td>1</td>
<td>PER ASTM A234-WPB</td>
</tr>
<tr>
<td>A</td>
<td>2”X3” FLANGED REGULATOR OUTLET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3” FLANGED ELBOW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 5M</td>
<td>5M FLANGED METER OUTLET OR</td>
<td>9352572</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C 7M</td>
<td>7M FLANGED METER OUTLET OR</td>
<td>9352499</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D 5M</td>
<td>5M FLANGED SPOOL PIECE OR</td>
<td>9359171</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D 7M</td>
<td>7M FLANGED SPOOL PIECE OR</td>
<td>9385893</td>
<td>1</td>
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</table>

REMAINING ITEMS 11 - 25

<table>
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<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SAP ITEM ID UNY, RI</th>
<th>QTY</th>
<th>MATERIAL NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>PIPE SUPPORT 16”-25” HEIGHT (BOTTOM SECT) ADJUSTABLE FROM 16” – 25” (TOP SECTION)</td>
<td>9323172</td>
<td>1</td>
<td>FOR ADDITIONAL SUPPORTS SEE MTRS-6475</td>
</tr>
<tr>
<td>12</td>
<td>GASKET 3” CLASS 150# FULL FACE</td>
<td>9341158</td>
<td>8</td>
<td>FLEXITALLIC SIGMA 511 PINK OR APPROVED EQ.</td>
</tr>
<tr>
<td>13</td>
<td>VALVE – 2” BALL VALVE CLASS 150# FLANGED ENDS</td>
<td>9368486</td>
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<tr>
<td>14</td>
<td>VALVE - 3” BALL VALVE CLASS 150# FLANGED ENDS</td>
<td>9357912</td>
<td>3</td>
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<tr>
<td>15</td>
<td>LOCKING DEVICE</td>
<td>9330915</td>
<td>3</td>
<td></td>
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<tr>
<td>16</td>
<td>REGULATOR 2” FLANGED ENDS</td>
<td>AS 9307971 By Eng.</td>
<td>1</td>
<td>SEVERAL MODELS LISTED HERE: ENG OR CUSTOMER SERVICE TO SPECIFY REGULATOR. REGULATORS MUST BE SIZED FOR THE FULL CAPACITY AT MINIMAL OPERATING MAIN PRESSURES AND MUST BE RATED FOR MAXIMUM OPERATING PRESSURES. CONTACT ENGINEERING.</td>
</tr>
<tr>
<td>17</td>
<td>STRAINER 2” FLANGED</td>
<td>9340158</td>
<td>1</td>
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<tr>
<td>18</td>
<td>GASKET 2” FULL FACE FOR 150# FF FLANGE</td>
<td>933167</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>BOLTS MACHINE – 5/8”X 1 5/16 TO 2-1/4” FHN HEX NUT</td>
<td>9304789</td>
<td>16</td>
<td>9306269 FOR BOLT / 9310614 FOR NUT IN RI</td>
</tr>
<tr>
<td>20</td>
<td>INSULATING FLANGE KIT / GASKET 150#</td>
<td>9340992</td>
<td>1</td>
<td>9308162 IN RI</td>
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<tr>
<td>21</td>
<td>FLANGE BLIND 3”</td>
<td>9358763</td>
<td>1</td>
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<tr>
<td>22</td>
<td>RISER 2”</td>
<td>By Field By Field</td>
<td>1</td>
<td></td>
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<tr>
<td>23</td>
<td>BOLTS FOR METER 5/8”X 1.5” LONG</td>
<td>9342412</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>MACHINE BOLTS, 5/8”X 2.75” LONG WITH HEX NUT</td>
<td>939766</td>
<td>32</td>
<td>9310616 FOR BOLT / 9310614 FOR NUT IN RI</td>
</tr>
<tr>
<td>25</td>
<td>METER 5M OR 7M TEMPERATURE CORRECTED</td>
<td>Meter Ops Meter Ops</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

BILL OF MATERIAL
TO BE USED FOR:
800 SCFH TO 3,000 SCFH
7", 14" OR 1 PSIG OUTLET

* ALL DIMENSIONS ARE BASED ON WELD NECK FLANGES, 3/8" WELD GAP AND 1/8" THICK GASKETS

MASS ITEM ID 9352442
UNY / RI ID 9306734

COMPONENT A

COMPONENT B

MASS ID 9352443
UNY / RI ID 9306732

COMPONENT C

COMPONENT D

8C - 3M PREFAB METER HEADER

LI - MA - NH - NYC - RI - UNY

REVISIONS: REVISED SAP ITEM ID'S

DATE: 03/26/2010
DESIGN: B. FOSTER / P. GUGLIO TTA
DRAWN: B. FOSTER / P. GUGLIO TTA

EFFECTIVE DATE: 02/15/2015
STD. DWG.
NO. 020010-CS

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FIELD INSTALLATION NOTES
A. CONTACT ENGINEERING FOR REGULATOR SIZING.
B. WHERE VEHICLE TRAFFIC IS A CONCERN, PROTECTION POST ARE REQUIRED. NATIONAL GRID PROTECTION POST STANDARDS MTRS-6060 CAN BE USED AS A GUIDELINE.
C. DO NOT WELD METER IN PLACE. USE A SPOOL PIECE.
D. ALL PREFAB PIPING SHALL SURFACE PREPARATION, PRIMING AND PAINTING SPECIFICATION: ALL SURFACES SHALL BE SOLVENT CLEANED IN ACCORDANCE WITH SSPC SP#1 STANDARD TO REMOVE ALL SOLUBLE SURFACE CONTAMINATES. APPLICATION SHALL BE ONE COAT OF SOLVENT BASED GRAY PRIMER MINIMUM OF 2-3 MILS, FOLLOWED BY ONE COAT OF SOLVENT-BASED ASA #49 GRAY ACRYLIC ENAMEL MINIMUM OF 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID ENGINEERING.

PREFABRICATION NOTES FOR ITEMS 1-9
E. ALL WELDING MUST CONFORM TO API-1104 PROCEDURES.
F. RADIOGRAPH SHALL BE 10% OF ALL WELDS OR PER NATIONAL GRID’S WELDING POLICY PROCEDURE.
G. ALL FLANGE OPENINGS SHALL BE COVERED WITH PLASTIC CAPS.
H. ASSEMBLY SHALL BE SUPPLIED IN 4 PIECES (3 PIPING & 1 FOR SUPPORT).
J. PIPING SHALL CONFORM TO NATIONAL GRID SPEC. 120020-MS.
K. ALL PIPING SHALL BE PRESSURE TESTED TO 90 PSIG FOR 5 MINUTES OR PER NATIONAL GRID’S PRESSURE TESTING PROCEDURE.

BILL OF MATERIAL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SAP ITEM ID</th>
<th>SAP ITEM ID UNY &amp; RI</th>
<th>QTY</th>
<th>MATERIAL NOTES</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>FLANGE 2” WELD NECK FLAT FACE</td>
<td>9341058</td>
<td>9312322</td>
<td>10</td>
<td>PER ASTM A-105 GR. B OR A-350 LF-2</td>
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<tr>
<td>2</td>
<td>TEE 2”, WELD END STD. WALL PER A-234 WPB</td>
<td>9342462</td>
<td>9315625</td>
<td>2</td>
<td>4801246 IN R.I. STD WALL, PER A-234 WPB</td>
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<tr>
<td>3</td>
<td>ELBOW 2” WELD END 90 DEG. LONG RADIUS</td>
<td>9341213</td>
<td>9315522</td>
<td>3</td>
<td>PER A-106 GR. B OR API 5L GR. B</td>
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<tr>
<td>4</td>
<td>PIPE 2” STEEL, STD. WALL (SCH. 40)</td>
<td>9340729</td>
<td>9312351</td>
<td>6</td>
<td>PER A-105 GRADE B</td>
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<tr>
<td>5</td>
<td>THRED-O-LET ½”X 2” PIPE 3000#</td>
<td>9341652</td>
<td>9311035</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>NIPPLE ¾” X 3” LONG</td>
<td>9340631</td>
<td>9315390</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>VALVE ½” LOCKING, TAMPER PROOF</td>
<td>9339593</td>
<td>9312257</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>PLUG ¾” SOLID STEEL OR CI</td>
<td>9340912</td>
<td>9312288</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR PREFABRICATED COMPLETED COMPONENTS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>2 INCH FLANGED REGULATOR OUTLET PIECE</td>
<td>9352442</td>
<td>9306734</td>
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<tr>
<td>B</td>
<td>FLANGED ELBOW</td>
<td>9383780</td>
<td>9306733</td>
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</tr>
<tr>
<td>C</td>
<td>FLANGED METER OUTLET PIECE</td>
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<td>SPOOL PIECE 8C, 1.5M OR 3M METER 2” X 6.75”</td>
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<td>PRECISION METER OUTLET PIECE</td>
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<td>PIPE SUPPORT 16”-25” HEIGHT (BOTTOM SECTION) ADJUSTIBLE FROM 16” – 25”</td>
<td>9323172</td>
<td>9314079</td>
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<td>FOR ADDITIONAL SUPPORTS SEE MTRS-6475</td>
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<td>VALVE – 2” BALL VALVE CLASS 150# FLANGED ENDS</td>
<td>9339881</td>
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<td>REGULATORS MUST BE SIZED FOR THE FULL CAPACITY AT MINIMAL OPERATING PRESSURES AND MUST BE RATED FOR THE MAX OPERATING PRESSURE. CONTACT ENGINEERING.</td>
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<td>REGULATOR 2” ACTARIS B34IMRV FLANGED ENDS 3/8” ORIFICE GREEN/WHITE SPRING 5.5” – 7.2” W.C. SET AT 7” W.C. (100 PSIG MAX INLET) OR ACTARIS B38 IMR AMERICAN 1843 WITH OPSO FISHER 50-203 FISHER S-208/209 WITH VSX SLAM SHUT</td>
<td>9330915</td>
<td>9312477</td>
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<td>GASKET 2” FULL FACE FOR 150# FF FLANGE</td>
<td>9333167</td>
<td>9315668</td>
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<td>9306269 &amp; 9310614 FOR RI</td>
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<td>15</td>
<td>BOLTS MACHINE – 5/8” X 1.5 TO 2-1/4” W2/2H HEX NUT</td>
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<td>9312366</td>
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<td>INSULATING FLANGE KIT / GASKET 150#</td>
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<td>FLANGE, BLIND 2”, CLASS 150# FF</td>
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<td>Field</td>
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<td>19</td>
<td>BOLTS FOR METER 5/8” X 1.5” LONG</td>
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<td>Meter Ops.</td>
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<td>20</td>
<td>METER 8C, 1.5M OR 3M TEMPERATURE CORRECTED</td>
<td>Meter Ops.</td>
<td>Meter Ops.</td>
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</table>

BILL OF MATERIAL
NOTES

A. REGULATOR VENT MUST FACE DOWN AND BE EQUIPPED WITH A RAIN AND INSECT RESISTANT SCREEN. IT IS PREFERRED THAT REGULATOR VENTS BE INSTALLED AT A HEIGHT 18 INCHES ABOVE GRADE, HOWEVER, THE MINIMUM ALLOWABLE VENT HEIGHT SHALL BE 12 INCHES ABOVE FINAL GRADE. IN CASES OF KNOWN FLOOD LOCATIONS, THE PREFERRED REGULATOR VENT HEIGHT ABOVE THE FLOOD HEIGHT IS 18" (12" MINIMUM). THE REGULATOR VENT SHALL BE 18" (WHERE PRACTICAL) FROM ANY OPENING WHICH COULD ALLOW VENTED GAS TO ENTER.

B. WHERE VEHICULAR TRAFFIC IS A CONCERN, INSTALL PROTECTION POST. SEE STANDARD DRAWING MTRS-6060 FOR INSTALLATION REQUIREMENTS.

C. ALUMINUM TAGS ARE REQUIRED FOR SERVICE THAT HAVE A REGULATOR AND WILL DENOTE SYSTEM PRESSURE, OUTLET PRESSURE AND INDICATE IF AN EFV IS INSTALLED.

D. FOR CAPACITIES GREATER THAN 630 CFH, AN 800 CLASS METER IS REQUIRED.

E. THE B31R 1-1/4" REGULATOR WITH ½" ORIFICE IS RATED FOR 440 CFH WITH 14" W.C. INLET PRESSURE AND 640 CFH AT 1 PSIG INLET PRESSURE. THIS, DEPENDING ON SYSTEM PRESSURES, A CAPACITY OF 630 CFH MAY NOT BE ACHIEVED ON THE 2 PSIG SYSTEM WITHOUT EXCESSIVE REGULATOR DROOP.

---

<table>
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<tr>
<th>No.</th>
<th>ITEM</th>
<th>⅛&quot; OR ¼&quot; SERVICE</th>
<th>1&quot; SERVICE</th>
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<td>ALUMINUM REGULATOR TAGS (SEE CUST-5175)</td>
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<tr>
<td>12</td>
<td>HOUSE PIPING TO LOAD</td>
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<td>CUSTOMER</td>
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<tr>
<td>11</td>
<td>ELBOW 90 DEGREES M.I., SIZE OF HOUSE PIPE</td>
<td>1-1/4&quot;</td>
<td>1-1/4&quot;</td>
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<td>7</td>
<td>NIPPLE ½&quot; X 4&quot; MINIMUM (LENGTH AS REQUIRED)</td>
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<td>VENT ASSEMBLY WITH INSECT RESISTANT SCREEN IF REQ'D, 1&quot;</td>
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<td>REGULATOR, 3/4&quot; X 1&quot; WITH 1/8&quot; ORIFICE FOR 100 PSIG</td>
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<td>REGULATOR, 3/4&quot; X 1&quot; WITH 3/16&quot; ORIFICE FOR 60 PSIG</td>
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<td>REGULATOR, 1&quot; X 1&quot; WITH ⅛&quot; ORIFICE 22/25 PSIG SYSTEM</td>
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<td>CAPACITY 630 SCFH WITH ⅛&quot; DIFFERENTIAL</td>
<td>⅛&quot; OR ¼&quot; SERVICE</td>
<td>1&quot; SERVICE</td>
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</tr>
</tbody>
</table>

BILL OF MATERIAL
### NOTES

A. **REGULATOR VENT MUST FACE DOWN AND BE EQUIPPED WITH A RAIN AND INSECT RESISTANT SCREEN.** IT IS PREFERRED THAT REGULATOR VENTS BE INSTALLED AT A HEIGHT 18 INCHES ABOVE GRADE, HOWEVER, THE MINIMUM ALLOWABLE VENT HEIGHT SHALL BE 12 INCHES ABOVE FINAL GRADE. IN CASES OF KNOWN FLOOD LOCATIONS, THE PREFERRED REGULATOR VENT HEIGHT ABOVE THE FLOOD HEIGHT IS 18" (12" MINIMUM). THE REGULATOR VENT SHALL BE 18" (WHERE PRACTICAL) FROM ANY OPENING WHICH COULD ALLOW VENTED GAS TO ENTER.

B. WHERE VEHICULAR TRAFFIC IS A CONCERN, INSTALL PROTECTION POST. SEE STANDARD DRAWING MTRS-6060 FOR INSTALLATION REQUIREMENTS.

C. **ALUMINUM TAGS ARE REQUIRED FOR SERVICE THAT HAVE A REGULATOR AND WILL DENOTE SYSTEM PRESSURE, OUTLET PRESSURE AND INDICATE IF AN EFV IS INSTALLED.**

D. FOR CAPACITIES GREATER THAN 630 CFH, AN 800 CLASS METER IS REQUIRED.

E. **THE B31R 1-1/4" REGULATOR WITH ½" ORIFICE IS RATED FOR 440 CFH WITH 14" W.C. INLET PRESSURE AND 640 CFH AT 1 PSIG INLET PRESSURE.** Thus, depending on system pressures, a capacity of 630 CFH may not be achieved on the 2 PSIG system without excessive regulator droop.

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<tr>
<td>14</td>
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<td>ALUMINUM REGULATOR TAGS SEE CUST-5175</td>
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<td>ELBOW 90 DEGREES M.I., SIZE OF HOUSE PIPE</td>
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<td>VENT ASSEMBLY WITH INSECT RESISTANT SCREEN IF REQ'D, 1&quot;</td>
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<td>5</td>
<td>METER CAP/NUT CONNECTION 45 LT</td>
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<tr>
<td>4</td>
<td>METER SWIVEL OFFSET 1-1/4&quot; X 45 LT</td>
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<td>3</td>
<td>REGULATOR, 1-1/4&quot; WITH ½&quot; ORIFICE FOR 2 PSIG SEE NOTE E</td>
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<td>METER BAR, W/INSUL. OUTLET MUELLER 701127K, 1-1/4&quot;X1-1/4&quot;X1-1/4&quot; TOP OUTLET, BLACK</td>
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**BILL OF MATERIAL**
FIGURE 1
HEAD ON PARKING

FIGURE 2
DRIVEWAY OR ADJACENT PARKING

GAS METER

8" MIN.

8" MIN.

PROTECTION POSTS

INSTALLATION OF PROTECTION POST OUTSIDE METER SETS

DATE: 07/01/2003  EFFECTIVE DATE: 09/15/2013

DESIGN: PG  STD. DWG. NO. MTRS-6060

DRAWN: PG

REVISIONS: MADE APPLICABLE TO ALL REGIONS

SHT. 1 OF 2