BLUEBOOK

SPECIFICATIONS AND REQUIREMENTS FOR GAS INSTALLATIONS

MASSACHUSETTS

AUGUST 2022

nationalgrid

IMPORTANT NOTICE

REGARDING

NATIONAL GRID SPECIFICATIONS AND REQUIREMENTS FOR GAS INSTALLATIONS

These Specifications and Requirements have been designed with great care so that, when followed consistently, they will ensure that a new installation will comply with Massachusetts State law, various codes and other safety requirements. Failure to comply may result in a code or safety *violation* and/or a job not being approved. Therefore, delays could result while the contractor corrects the changes at his/her expense.

The specifications, construction standards and other requirements contained in this book represent National Grid commitment to the contracting community for quality and consistency of service. Any variation from the type of hardware used, connection point of service, service entrance or other details on a construction standard must be approved in advance by National Grid in writing.

We at National Grid are always available to discuss your design concerns and to provide assistance to you. We encourage any questions regarding your problems on specific projects, please be sure to contact us for our input during the *planning* stages to avoid possible additional costs later in the job.

Paul Gugliotta – Gas Materials & Standards
Barry Foster – Gas Materials & Standards

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The power of action℠

Ensuring a Successful Gas Meter Set

- ✓ **All gas risers shall be 18” from any window or door. See 020013-CS for additional clearances**
- ✓ **All new Gas Services and Meters shall be located outdoors (unless impractical or unsafe). All meter sets shall be kept plumb and square.**
- ✓ **Final grade has a minimum 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 unit’s locations**
- ✓ **Protection posts shall be installed to code if required to prevent vehicular damage**
- ✓ **Make up air requirements meet combustion needs**
- ✓ **City, State, Town, or Village pressure test certificate has been left on site for National Grid if required by the authority having jurisdiction before meter can be set**
- ✓ **All customer owned piping is installed to National Grid’s Blue Book requirements, and meets City, State, Local, IFGC code. All CSST products must meet manufacturer’s bonding requirements.**
  Check with the authority having jurisdiction to verify the code they are following
- ✓ **National Grid has access to the dwelling to install meter and fire one piece of equipment to obtain Lock Up and Running Pressures. The gas meter fit location must be accessible to National Grid and Fire Department 24/7**

GAS METER SET APPOINTMENT CONTACT NUMBER

1-800-233-5325

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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:

a. The National Fuel Gas Code (NFPA 54/ANSI Z223.1), latest revision, referred to in the book as NFPA 54**.**

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 **National Grid Representative** 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.

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 shal 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 building 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 a pressure 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.

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'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, seamless and dependable gas service. Achievement of this goal begins early in the process of any gas installation. We believe that this can be best 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 must be shut off and the gas service to be cut off by National Grid as close as practicable to the main. 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 1 (800) 233-5325 or email NESALES@nationalgrid.com**

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 SAEFTY

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 (LOAD LETTTER) including:

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

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
- Final Grade must be identified.
- Building must be weather-tight.

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 (CALL 811)
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 **811** 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 ne ot 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 sub-contractors 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 Customer Connections 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 by an OP Qualified Installer.

Depth of Cover for service lines: See National Grid Drawing CNST-6030-MA-RI.

a) Service lines shall be installed with 24 inches, but no less than 18 inches of cover below final grade in the street and public areas 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 loads and require roadway plating as shown in National Grid Drawing CNST-6030-MA-RI.

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 meters 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. See SERV-6205

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"- 7"** 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 020013-CS.

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.

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 Venting of Service Regulator Standard 020013-CS.

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 7.7 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 shall 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's Gas Representative to discuss what to expect regarding role and their own role 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
- Inoperable window

7.3 INSTALLATION AND INTERCONNECTION REQUIREMENT

7.3.1 The meter header shall be installed according to the **National Grid** construction standard. The most commonly used construction standards are included.

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 may be furnished for that particular installation through **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 the meter header or 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 will be needed by the appropriate National Grid committee.

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 identified and furnished to the contractor.

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 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 and large multi-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. See MTRS-6505

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 for Massachusetts 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, 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 Representative.**

All large commercial regulators and relief valves installed indoors shall have the vent piped to the outdoors by the contractor. All regulator vent installations shall

be sized by National Grid and terminated with 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 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.

7.10.9 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 may 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 system upon reconnection, 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 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. The pilot gas supply may be taken off the interruptible gas meter supply line.

7.14.2 For new installations requiring a separate gas pilot supply line, the pilot gas supply shall be supplied by a low-pressure 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.

The maximum design/operating pressure for gas piping systems located inside buildings shall not exceed ***1/2 psig*** **(14" w.c.)** unless:

1. Approved by National Grid
2. As followed by NFPA 54, and the Massachusetts Fuel Gas Code Section 5.5.1.

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 and the Massachusetts Fuel Gas Code. Gas Ranges shall have a minimum pipe size of 1/2" nominal size for buried piping ¾" is the minimum size.

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.***

For operating pressures >1/2 PSIG, special permission must be granted by the Mass. Plumbing Board.

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 5.4.2.3) 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 **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.
- Copper tubing with brazed or flared joints. ***When copper is used, a minimum wall thickness shall be used as specified for type "K" or "L" pipe according to ASTM B88.***

- **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 or copper 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 medium density yellow or 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

PLASTIC PIPE SDR RATINGS AND WALL THICKNESSES

SIZE	SDR RATING	WALL THICKNESS
½"CTS	SDR 7	.090"
1" CTS	SDR 11.5	.099"
1 ¼"	SDR 10	.166"
2"	SDR 11	.216"

8.4.6 GAS PIPING BELOW GROUND, COPPER TUBING OPTION

Minimum wall thickness when using copper shall be as specified for type "K" or "L" tubing, according to ASTM B88, soft copper.

- Fittings for copper tubing shall be wrought copper. Cast fittings are not permitted. See Section 8.13 for copper installations.

NOTE

Copper tubing shall not be used above or below ground from the meter outlet to the building foundation, such as from remote meter pad locations, under the building foundation, or through the building wall. **Installation requirements and details for copper tubing** ***installed below ground are provided in Section 8.13.***

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, TESTING AND 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

When the MAOP of the piping system exceeds 5 psig, it must be welded per 248 CMR Section 5.6.2.2.1

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..8

8.6.4 WELDER QUALIFICATIONS

Welders shall be qualified in accordance with 248 CMR Section 5.06

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 shutoff 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 DigSafe Code (49CFR Part 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: **See Section 8.12 for plastic pipe installations.**

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.

8.8.11 Plastic piping shall not be run in the vicinity of steam lines where temperature of the pipe may exceed 100 degrees F, nor shall plastic pipe be run in the vicinity of soil contaminated with hydrocarbons. Both cases can lead to the degradation of the pipe.

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 Mechanical fittings shall not be used where pressure exceeds 5 psi or pipe size is greater than 4" diameter, except in certain instances where a customer-owned piping system qualifies. 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. 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" directly above the plastic pipe and at least 6" below grade 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 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 One 3-pound anode shall be installed where the total underground piping length is 10 feet or less. When the total length of underground pipe is greater that 10 feet, install one 17-pound magnesium anode for every 100 feet of underground piping. ***Note: Always bury an anode with the container it comes in. Do not remove it from the cardboard box!***

8.11.3 The anode ingot shall be buried in the soil approximately 2 feet to the side and below the level of the piping at a location near the center of the section pipe being protected.

8.11.4 The wire lead shall be attached to a bare steel area of the pipe using a thermite weld kit, using a #15 Green Cap cartridge specifically manufactured for attachment to schedule 40 pipe. After attaching, the coating in the thermite-welded area shall be restored (re-coated) so that no bare metal remains.

8.12 COPPER TUBING INSTALLATION REQUIREMENTS (Where allowed by Code)

The sizing of copper tubing shall be selected based upon the maximum capacity of natural gas in cubic feet per hour as specified in of NFPA-54.

8.12.1 **Fittings for copper tubing shall be wrought copper. Cast fittings are not permitted.**

8.12.2 Copper tubing shall not be used above or below ground from the meter outlet to the building foundation, such as from remote meter pad locations, under the building foundation, or through the building wall.

8.12.3 ***Soft solder joints (sweated joints) shall not be permissible.***

8.12.4 When mechanical joints are necessary for joining copper tubing standard SAE flared fittings shall be used.

8.12.5 ***Threading of copper tubing shall not be permissible.***

8.12.6 Insulating couplings or fittings shall be used to isolate transitions from copper to other metal piping and to electrically separate the underground portion of copper tubing with the tubing above ground or the tubing in a building.

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

8.13.1 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**. If galvanized pipe is used, taping of the pipe is not required, but it is recommended that the exposed threads be painted.

8.13.2 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 heatproducing 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 using wire brushes and a vacuum.

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. Within Massachusetts, the appliance shall be approved for use in the Massachusetts.

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

Any gas utilization equipment not covered in this manual shall be installed according to the National Fuel Gas Code and the Massachusetts Fuel Gas Code. National Grid shall be consulted for further guidance on any equipment not covered in this book.

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 manufacturers 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 the table below in this Appendix, and installed in accordance with the National Grid Construction Standard 020013-CS 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

NATIONAL GRID ITEM ID	VENT PIPE DIAMETER
9385637	3/4"
9358640	1”
9310355	2”

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. 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 the following table, the maximum length of vent pipe and number of fittings allowed in each case **shall not be exceeded under any circumstances.**

RECOMMENDED VENT LINE SIZING CHARTS

Service Regulator Allowable Vent Length					
Service Regulator	**Orifice Size**	**Vent Pipe Diameter**	**Maximum System Pressure**	**Maximum Allowable Length**	**Number of 90 degree Elbows**
¾ x 1 ¾ x ¾ 1" 1-1/4"	1/8"	1"	100 PSIG & 125 PSIG	50 feet	1
				48 feet	2
				46 feet	3
¾ x 1 ¾ x ¾ 1" 1-1/4"	3/16"	1"	60 PSIG	30 feet	1
				28 feet	2
				26 feet	3
¾ x 1 ¾ x ¾ 1" 1-1/4"	1/4"	1"	30 PSIG	30 feet	1
				28 feet	2
				26 feet	3
¾ x 1 ¾ x ¾ 1" 1-1/4"	5/16"	1"	15 PSIG	30 feet	1
				28 feet	2
				26 feet	3
1-1/4"	½"	1"	2 PSIG	10 feet	1
				8 feet	2
				6 feet	3
2" x 2"	1/4"	1"	100 PSIG & 125 PSIG	12 feet	1
2" x 2"	3/8"	2"	60 PSIG	12 feet	1

Note 1: When maximum allowable length is exceeded the diameter of vent pipe shall be increased. Reducer, needed to increase vent pipe size, shall be placed as close as practical to service regulator vent, preferably immediately at the service regulator vent outlet.

APPENDIX B

APPENDIX B

CHOOSING A FURNACE OR BOILER

Higher Efficiency. Its Advantages and Disadvantages

Since the energy crisis of the 1970's consumers have been motivated to demand higher efficiency furnaces and boilers, and to increase the thermal insulation and tightness of their homes. As a result, manufacturers have responded with the higher efficiency heating units which are widely in use today, and builders have responded with the increase in tighter construction methods for homes now equally widely used. As a result of these new trends, a significant amount of attention has been focused on certain technical topics in the heating business which have traditionally been accepted as cut and dried, but recently have caused some controversy. It was discovered, to the dismay of many, that these long-accepted ways of installing heating appliances are no longer valid. The changes faced by today's furnace and boiler installers include increased efficiency, reduced dilution air, increased air contamination and decreased heating loads. It has been common to discover that new installations are deficient because of improper combustion, dilution and ventilation air, and even improperly selected boiler or furnace sizes. Therefore, the following information is provided to help ensure that new installations and conversions are properly designed and installed. The correct place to begin is for to selecting a furnace or boiler for your installation.

Increased Thermal Efficiency Proper Venting

Increased thermal efficiency of newer units means, among other things, that for a given retrofit installation in a building that has not been modified using insulation and/or caulking, a smaller capacity unit will often do the same job as the older unit did. But it is possible that the older unit may not have been sized correctly! Indeed, many older units were oversized. Therefore, it can be problematic to simply substitute a new unit of the same input as the older one., Increased efficiency of abeating unit typically means a lower flue gas temperature, since most higher efficiency units wring out more Btu's from the flue gases in their heat exchangers. This lower outlet temperature means that the flue gases start their trip out the vent much closer to their dewpoint. Thus, condensate will be produced in the vent earlier in the on-cycle, and more condensate per total unit volume of flue gases will be produced in the new units than in the older, less efficient units. This means that the "wet time" in the vent will be longer, during which time the condensate stays in the stack without being vaporized by flue gases.

Since many Category I, mid-efficiency units are fan-assisted, the draft hood is eliminated, thereby essentially eliminating dilution air to the vent, reducing the total vent flow. Combining this characteristic with the use of vent dampers, off cycle loss of gases through the vent is reduced drastically. As a result, no dilution air can be relied on during the off cycle to help dry the stack. In addition, these characteristics combine to leave a vent pipe even colder during the off-cycle than in older less efficient units, requiring a longer time to heat up during the on-cycle.

In summary, comparing a newer, more efficient unit to an older less efficient unit of the same input, a smaller volume of flue gases will flow in the new unit at a lower temperature through a colder vent, which must be relied upon to remove essentially the same amount of water vapor as was produced in the old unit. The capacity of these gases to vaporize the moisture is significantly less in the new unit as compared to the old. The result is longer wet time in the new unit's vent, a condition which promotes corrosion very quickly, especially if chlorine from indoor air condition is absorbed into the condensate, producing hydrochloric acid. A corroded vent can release deadly carbon monoxide into the living space. An equally deadly scenario is the deterioration that takes place in a masonry chimney, where the mortar disintegrates, the lining collapses, and the chimney becomes blocked, also spilling flue gases into the living space.

Special care must be taken when replacing older heating equipment that will be vented into an existing exterior masonry chimney. Please follow the Venting tables listed in NFPA-54 or the FGCNYS.

Tighter Buildings: Combustion Air

If the building has been upgraded with new insulation, thermal-pane and tightly sealed windows, along with caulking and wrapping, the thermal characteristics of the building have been altered to make it more thermally efficient. The increased thermal efficiency of a building means the heating load is lower. The tightness of the building means the infiltration losses have been decreased, but the combustion air requirements, which formerly depended on a certain amount of infiltration, must be closely re-examined. If infiltration, and therefore some of the source of combustion air, has been drastically reduced, the reduction can increase spillage of combustion products upon start-up of a draft hood appliance. Secondly, the lowered rate of air change means that any source of combustion air contamination, such as chlorides from hairsprays, etc. will remain at an elevated concentration rather than be diluted. Contaminants containing chlorine have been shown to greatly increase the corrosivity of flue gas condensate, forming hydrochloric acid.

All of these characteristics taken together require that a vent be sized as carefully as possible, with special attention not to over-size the vent. In the past, gas furnaces and boilers released more than 25 % of their input energy into their vents. This generous amount of heat flowing through the vent made vents much more forgiving of design errors. Now, proper venting of higher efficiency furnaces and boilers requires more knowledge and greater care on the part of the installer.

A Case of Improper Venting

Clearly, a great deal of attention must be paid to venting of modem boilers/furnaces. Take as an example, a typical situation where a person installs a new boiler to replace an aging, less efficient one. In assessing the situation, it is determined that a newer, Category I, mid efficiency, fan assisted unit is a sound, economical choice. It seems logical that a unit of the same input rating should be selected. A contractor is hired, and installs most things properly, but vents the unit to the same outside chimney used for the older unit. After a period of time, the consumer calls National Grid Energy Delivery to trouble-shoot a "leak" in his newly installed boiler. He is dismayed to discover that there is no real leak, but that his chimney is condensing. He decides that this is not a real problem, and that there is no need for further action. Soon his chimney tiles begin to collapse inside, and begin to block the vent gases to the point where the unit shuts down on high pressure. Now he has a very large repair bill on his hands to rectify his collapsed chimney. All of this could have been prevented by selecting the correct venting arrangement. In this case, an approved, listed chimney liner system, properly sized and installed, would have saved a large sum of money and many headaches.

Pre-Sale Inspection

The heating contractor seeking to sell a furnace should begin approaching a job by first carefully assessing the heating load of the structure, the suitability of the existing system vent, and the environment into which the unit will be placed. It is also important that sales and installation personnel understand the venting characteristics of the different types of appliances available on the market, as well as the differences in combustion, dilution and ventilation air requirements of the newer, higher efficiency units. Computer heat loss programs exist in the market today that make this tedious task less demanding.

Special care must be taken when replacing older heating equipment that will be vented into an existing exterior masonry chimney

Retrofit furnaces or boilers should not be recommended to the consumer on the basis of rules-of-thumb regarding the heat load, nor should it be assumed that the existing venting system can be used without modification. It is imperative that the selection and sales process include a pre-sale inspection of the existing furnace or boiler, the venting system, and the building. It is important to recognize that every furnace or boiler is not equally well suited to every installation. The inspection will help the seller to accurately determine which furnace or boiler can be recommended to the consumer, and will avoid problems for all parties involved.

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 arching 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.**

BOSTON FIRE DEPARTMENT
FIRE PREVENTION DIVISION

1010 MASSACHUSETTS AVENUE
BOSTON, MA 02118
(617) 343-2189 FAX (617) 343-3604

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

nationalgrid

The power of action℠

Ensuring a Successful Gas Meter Set

- ✓ **All gas risers shall be 18” from any window or door. See 020013-CS for additional clearances**
- ✓ **All new Gas Services and Meters shall be located outdoors (unless impractical or unsafe). All meter sets shall be kept plumb and square.**
- ✓ **Final grade has a minimum 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 unit’s locations**
- ✓ **Protection posts shall be installed to code if required to prevent vehicular damage**
- ✓ **Make up air requirements meet combustion needs**
- ✓ **City, State, Town, or Village pressure test certificate has been left on site for National Grid if required by the authority having jurisdiction before meter can be set**
- ✓ **All customer owned piping is installed to National Grid’s Blue Book requirements, and meets City, State, Local, IFGC code. All CSST products must meet manufacturer’s bonding requirements.**
  Check with the authority having jurisdiction to verify the code they are following
- ✓ **National Grid has access to the dwelling to install meter and fire one piece of equipment to obtain Lock Up and Running Pressures. The gas meter fit location must be accessible to National Grid and Fire Department 24/7**

GAS METER SET APPOINTMENT CONTACT NUMBER

1-800-233-5325

APPENDIX F

LINKS TO VARIOUS MANUFACTURES:

HEATING MANUFGACTURERS
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

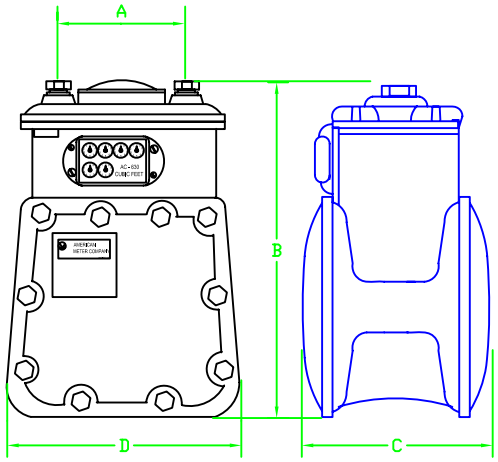
APPENDIX G

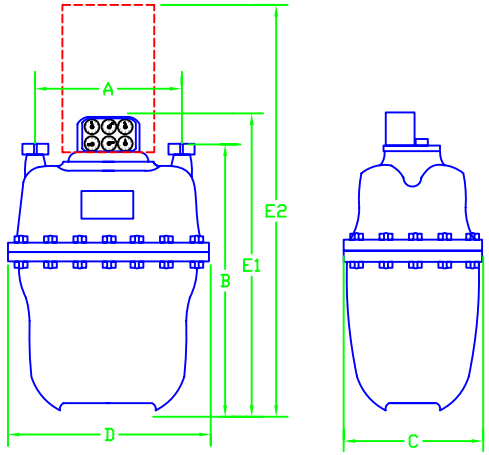
HARD CASE DIAPHRAM METERS

(For Indoor and Outdoor Applications)

Meter Class	METER TYPE	Manuf	A	B	C	D	E 1	E 2	REF DRAWING	WALL-CNTR OF SWIVL	SWIVL SIZE	PIPE SIZE
250	Metris 250TC	Sprague	7 3/4	11 1/8	6	7 3/4	-	-	A	7	20 LT	1 1/4
	AC250TC	American	6	13 7/8	8 1/2	9 5/8	-	-	A	7	20 LT	1 1/4
	R275TC	Rockwell	6	13 7/8	8 1/2	9 5/8	-	-	A	7	20 LT	1 1/4
400	400ATC (30-Lt)	Sprague	8 1/4	17 1/16	10 3/4	12 1/8	-	-	A	7	45 LT	1 1/4
	AL425TC (30-Lt)	American	8 1/4	14 7/8	10	10 3/4	-	-	A	7	45 LT	1 1/4
	R415TC (30-Lt)	Rockwell	8 1/4	14 7/8	9 3/8	11 1/8	-	-	A	8	45 LT	1 1/4
400	400ATC (45-Lt)	Sprague	8 1/4	17 1/16	10 3/4	12 1/8	-	-	A	7	45 LT	1 1/4
	AL425TC (45-Lt)	American	8 1/4	14 7/8	10	10 3/4	-	-	A	7	45 LT	1 1/4
	R415TC (45-Lt)	Rockwell	8 1/4	14 7/8	9 3/8	11 1/8	-	-	A	8	45 LT	1 1/4
600	AC630TC	American	8 1/4	15	10	10 1/2	-	-	A	7	45 LT	1 1/4
800	800ATC	Sprague	11	26 5/16	13 1/4	14 1/8	23 1/2	-	B	9	45 LT	1 1/2
	AL800TC	American	11	27	14 5/8	17 1/4	24 3/16	-	B	10	45 LT	1 1/2
	R750TC	Rockwell	11	27	14 5/8	17 1/4	24 3/16	-	B	10	45 LT	1 1/2
1000	1000ATC	Sprague	11	26 5/16	16 3/8	18	25	-	B	11	2 "	2"
	AL1000TC	American	11	27	13 3/8	14 1/4	23 1/2	-	B	9	2 "	2"
	R1000TC	Rockwell	11	27	14	14/34	23 3/4	-	B	10	2"	2"

NOTE: Meter class "400": NYC has 30-Lt connections
Long Island has 45-Lt connections

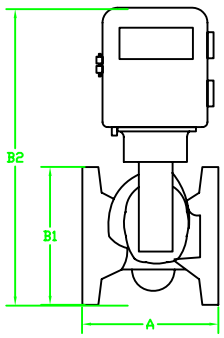


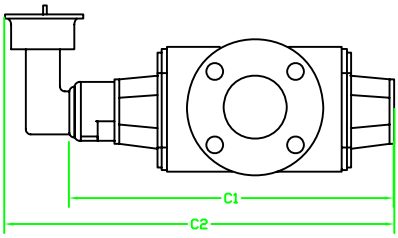


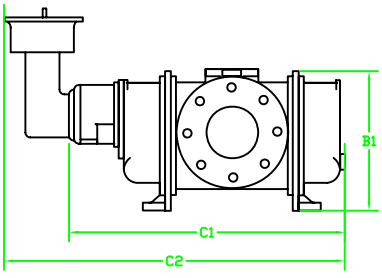
Meter Type	Mfg	A	B 1	B 2	C 1	C 2	Pipe Size
8CTC (non-ID)	Dresser	6 3/4	6 31/32	-	-	19 1/4	2
11CTC (non-ID)	Dresser	6 3/4	6 31/32	-	-	19 3/4	2
15CTC (non-ID)	Dresser	6 3/4	6 31/32	-	-	20 11/16	2
2MTC (non-ID)	Dresser	6 3/4	6 31/32	-	-	20 13/32	2
3MTC (non-ID)	Dresser	6 3/4	6 31/32	-	-	21 5/8	2
5MTC (non-ID)	Dresser	6 3/4	6 31/32	-	-	24 1/2	3
7MTC (non-ID)	Dresser	9 1/2	8 7/8	-	-	24 3/16	3
11MTC (non-ID)	Dresser	9 1/2	8 7/8	-	-	27 3/4	4
16MTC (non-ID)	Dresser	9 1/2	8 7/8	-	-	32 7/16	4
8C-ID (TC or nonTC)	Dresser	6 3/4	6 31/32	-	-	19 1/4	2
11C-ID (TC or nonTC)	Dresser	6 3/4	6 31/32	-	-	19 3/4	2
15C-ID (TC or nonTC)	Dresser	6 3/4	6 31/32	-	-	20 11/16	2
2M-ID (TC or nonTC)	Dresser	6 3/4	6 31/32	-	-	20 13/32	2
3M-ID (TC or nonTC)	Dresser	6 3/4	6 31/32	-	-	21 5/8	2
5M-ID (TC or nonTC)	Dresser	6 3/4	6 31/32	-	-	24 1/2	3
7M-ID (TC or nonTC)	Dresser	9 1/2	8 7/8	-	-	24 3/16	3
11M-ID (TC or nonTC)	Dresser	9 1/2	8 7/8	-	-	27 3/4	4
16M-ID (TC or nonTC)	Dresser	9 1/2	8 7/8	-	-	32 7/16	4
23M-ID (line mounted)	Dresser	9 1/2	8 7/8	-	-	32 3/16	4
38 M- ID	Dresser	18	18	-	-	36 3/4	6
56 M-ID	Dresser	21	18	-	-	40	8
9C - CMTC	American	6 3/4	6 31/32	-	-	19 1/4	2
1.5M - CMTC	American	6 3/4	6 31/32	-	-	20 13/32	2
3.5M - CMTC	American	6 3/4	6 31/32	-	-	21 5/8	2
7M - CMTC	American	9 1/2	8 7/8	-	-	24 3/16	3
11M - CMTC	American	9 1/2	8 7/8	-	-	27 3/4	4

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"

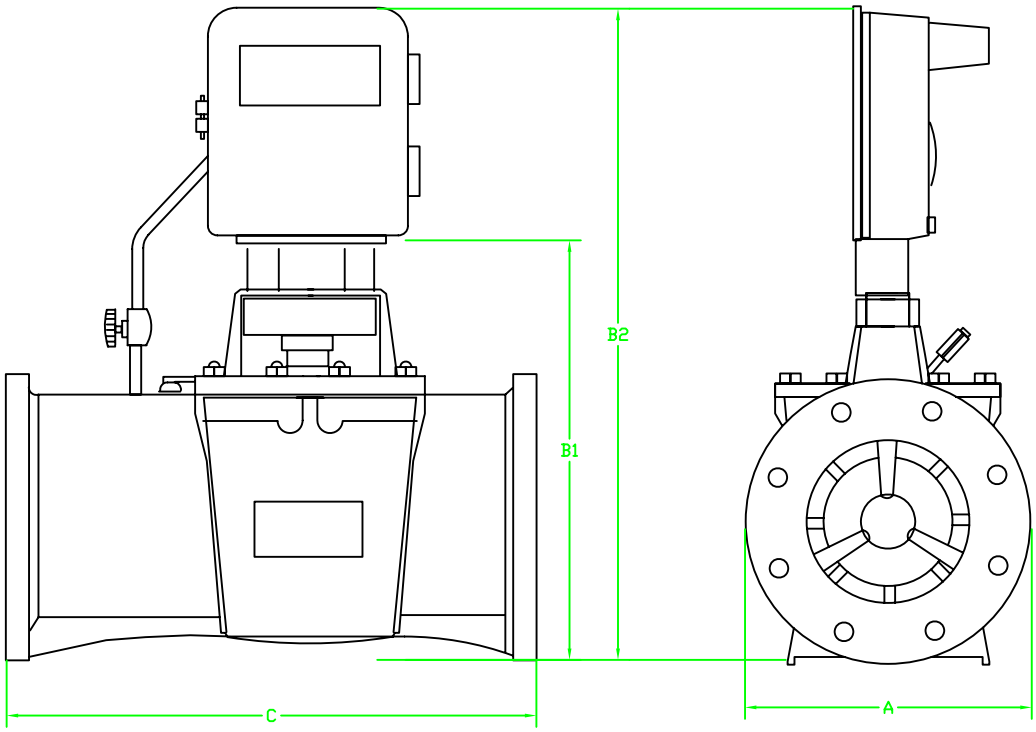






SENSUS/ROCKWELL TURBINE METERS

Meter					Inlet
Size/Type	A	B1	B2	C	Pipe Size
		Dimensions (inches)			
4"AAT18	9	14 3/16	23 11/16	14	4
4"AAT27	9	14 3/16	23 11/16	14	4
6"AAT35	11	14 3/16	22 1/2	16	6
6"AAT57	11	14 3/16	22 1/2	16	6
8"AAT60	13 1/2	19 11/16	29 3/16	21	8
8"AAT90	11	17 3/16	26 11/16	16	8
12"AAT140	13 1/2	19 11/16	29 3/16	21	12
12"AAT230	19	25 3/16	37 11/16	30	12
4"AAT18 (720#)	10 3/4	12 11/16	23 11/16	14	4
4"AAT27 (720#)	10 3/4	12 11/16	23 11/16	14	4
6"AAT35 (720#)	14	15 1/8	26 11/16	22 1/2	6
6"AAT57 (720#)	14	15 1/8	26 11/16	22 1/2	6
8"AAT60 (720#)	13 1/2	19 11/16	29 3/16	27 14	8
8"AAT90 (720#)	11	17 3/16	26 11/16	27 14	8
12"AAT140 (720#)	13 1/2	19 11/16	29 3/16	32 1/2	12
12"AAT230 (720#)	19	25 3/16	37 11/16	32 1/2	12

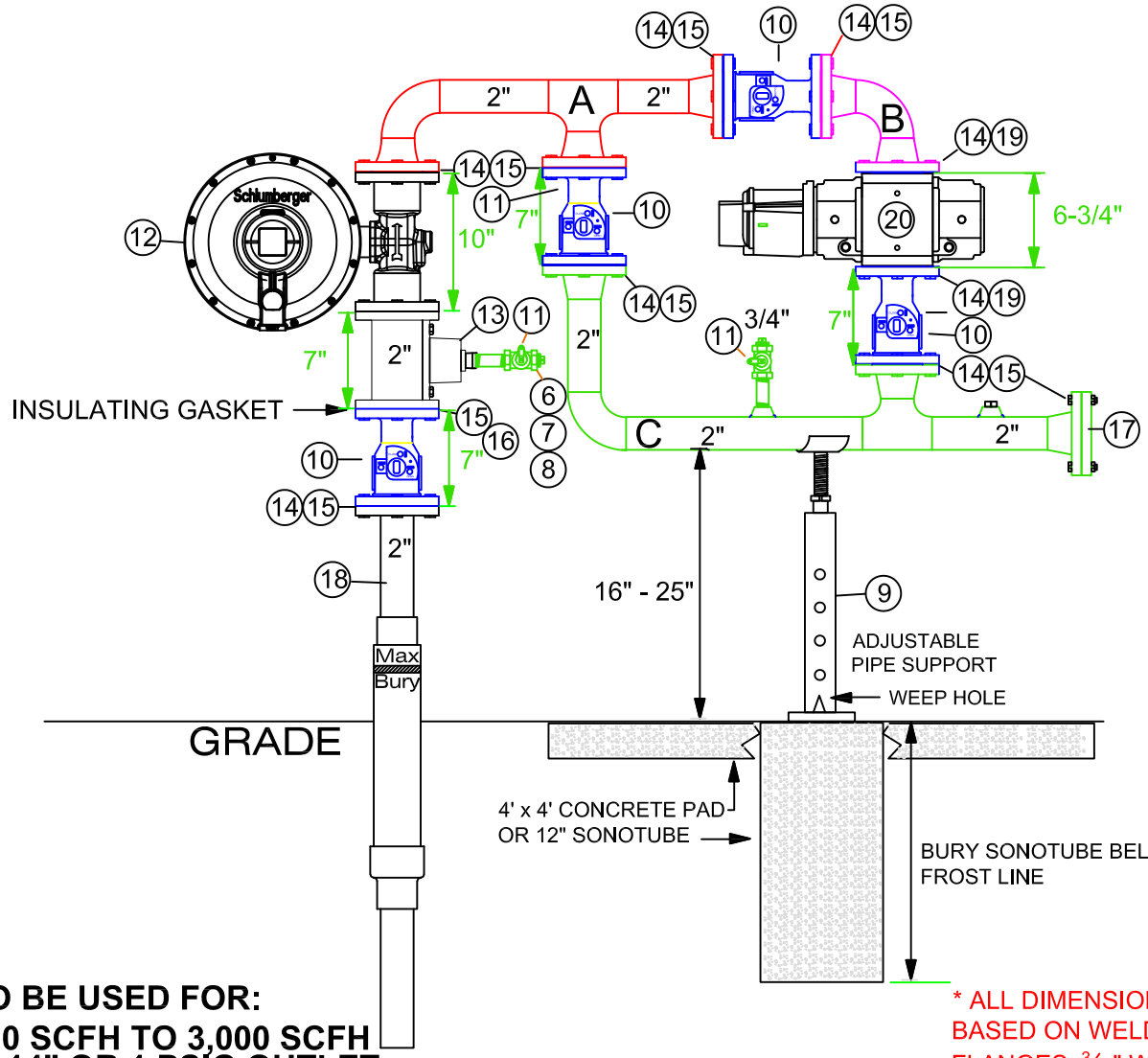


APPENDIX H

These are the most commonly used Construction Standards. They are linked to the National Grid's Website. Using these links will assure you will have the latest copy. The printed Standards included in Appendix H were updated as of June 2020.

020010-CS	8C – 3M PREFAB METER HEADER
020011-CS	5M AND 7M PREFAB METER HEADER
020013-CS	REGULATOR VENT AND METER CLEARANCE FOR OUTDOOR LOCATIONS
030024-CS	INSTALLATION OF ANODES
030031-CS	FACILITY COATING GUIDE
CNST-6030	PROTECTIVE STEEL PLATING FOR GAS MAINS AND SERVICES
CNST-6061	TRACER WIRE INSTALLATIONS FOR PLASTIC MAINS AND SERVICES
CS-CNST002	TYPICAL UTILITY CROSSING AND TRENCH GUIDELINES
CS-DAM01016	MARKOUT OF UNDERGROUND FACILITIES
CS-MET016	RESIDENTIAL OUTDOOR METE SUPPORTS FOR 250-1000 METERS
CS-MET017	4" MULTI-METER HEADER
CS-MET018	VENTING FOR COMMERCIAL REGULATORS WITH OPSO
MTRS-6060	INSTALLATION OF PROTECTION POSTS ON OUTSIDE METER SETS
MTRS-6141	SINGLE METER AND REGULATOR FOR 630 CLASS METER
MTRS-6143	CLEARANCES ON TYPICAL HP OR LP SERVICE RISER INSTALLATIONS
MTRS-6601	250 AND 400 PREFAB FOR 35-100 PSIG PRESSURE SYSTEMS
MTRS-6604	250 AND 400 PREFAB SINGLE METER SET WITH BYPASS 7.5 – 30 PSIG INLETS
MTRS-6606	250 AND 400 PREFAB FOR LOW PRESSURE SYSTEMS
MTRS-6609	250 AND 400 PREFAB FOR 2-5 PSIG PRESSURE SYSTEMS
MTRS-6611	PREFAB METER SET FOR ROTARY METER – LOW PRESSURE
MTRS-6612	PREFAB METER SET FOR ROTARY METER – 2" REGULATOR
MTRS-6613	PREFAB METER SET FOR ROTARY METER – ¾" X 1" REGULATOR
MTRS-6620	PREFAB SINGLE MANIFOLD – NO BYPASS
MTRS-6621	PREFAB DOUBLE MANIFOLD – NO BYPASS
MTRS-6622	PREFAB TRIPLE MANIFOLD – NO BYPASS
MTRS-6623	PREFAB SINGLE MANIFOLD – WITH BYPASS METER BAR
MTRS-6624	PREFAB DOUBLE MANIFOLD – WITH BYPASS METER BAR
MTRS-6625	PREFAB TRIPLE MANIFOLD – WITH BYPASS METER BAR
MTRS-6650	8C, 1.5, 3M METERING LOW PRESSURE
MTRS-6662	8C, 1.5, 3M METERING WITH BYPASS
MTRS-6650	8C, 1.5, 3M METERING LOW PRESSURE
MTRS-6655	8C, 1.5, 3M METERING HIGH PRESSURE METERING
MTRS-6660	8C, 1.5, 3M METERING 2" REGULATOR
MTRS-6661	8C, 1.5, 3M VERTICAL METER WITH REGULATOR
MTRS-6662	8C, 1.5, 3M METERING WITH REGULATOR AND BYPASS
MTRS-6665	5M/7M METERING LOW PRESSURE
MTRS-6667	11M/16M METERING LOW PRESSURE
MTRS-6670	5M/7M METERING HIGH PRESSURE

MTRS-6675	5M/7M METERING HP MAIN /LOW PRESSURE METERING
MTRS-6690	11M/16M ROTARY METERING WITH MONITOR – CONTROL W/ SENSUS 121 REGULATORS (METER ON HP SIDE)
MTRS-6691	11M-23M ROTARY METERING WITH MONITOR – CONTROL W/ SENSUS 121 REGULATORS (METER AFTER REGULATOR)
MTRS-6695	4” TURBINE METER WITH MONITOR – CONTROL W/ SENSUS 121 REGULATORS (METER ON HP SIDE)
MTRS-6700	6” TURBINE METER WITH MONITOR – CONTROL W/ SENSUS 121 REGULATORS (METER ON HP SIDE)
MTRS-6705	8” TURBINE METER WITH MONITOR – CONTROL W/ SENSUS 121 REGULATORS (METER ON HP SIDE)
MTRS-6710	4” TURBINE METER – LOW PRESSURE MAIN
MTRS-6715	6” TURBINE METER – LOW PRESSURE MAIN
MTRS-6720	8” TURBINE METER – LOW PRESSURE MAIN
FITS-6115	GASKETS AND BOLTS



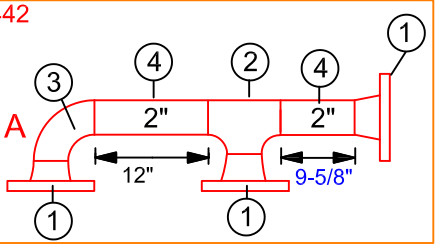
TO BE USED FOR:
800 SCFH TO 3,000 SCFH
7", 14" OR 1 PSIG OUTLET

* ALL DIMENSIONS ARE BASED ON WELD NECK FLANGES, 3/32" WELD GAP AND 1/16" THICK GASKETS

PREFAB COMPONENTS

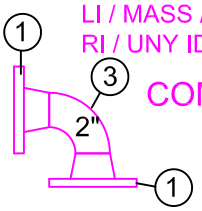
MASS ITEM ID 9352442
UNY / RI ID 9306734

COMPONENT A



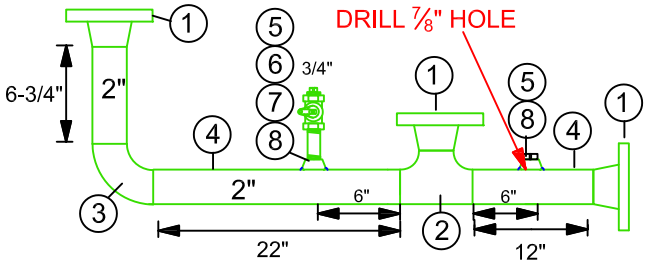
LI / MASS / NYC ITEM ID 9383780
RI / UNY ID 9306733

COMPONENT B

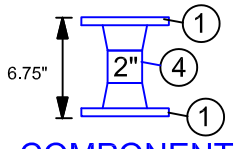


MASS ID 9352443
UNY/ RI ID 9306732

COMPONENT C



METER SPOOL PIECE
NY/LI/NYC ID 9352024



COMPONENT D

nationalgrid

ALL REGIONS

8C - 3M PREFAB METER HEADER

REVISIONS: REVISED SAP ITEM ID'S

DATE: 03/26/2010	EFFECTIVE DATE: 05/4/2020
DESIGN: B. FOSTER/P. GUGLIOTTA	STD. DWG. NO. 020010-CS
DRAWN: B. FOSTER/P. GUGLIOTTA	

FIELD INSTALLATION NOTES

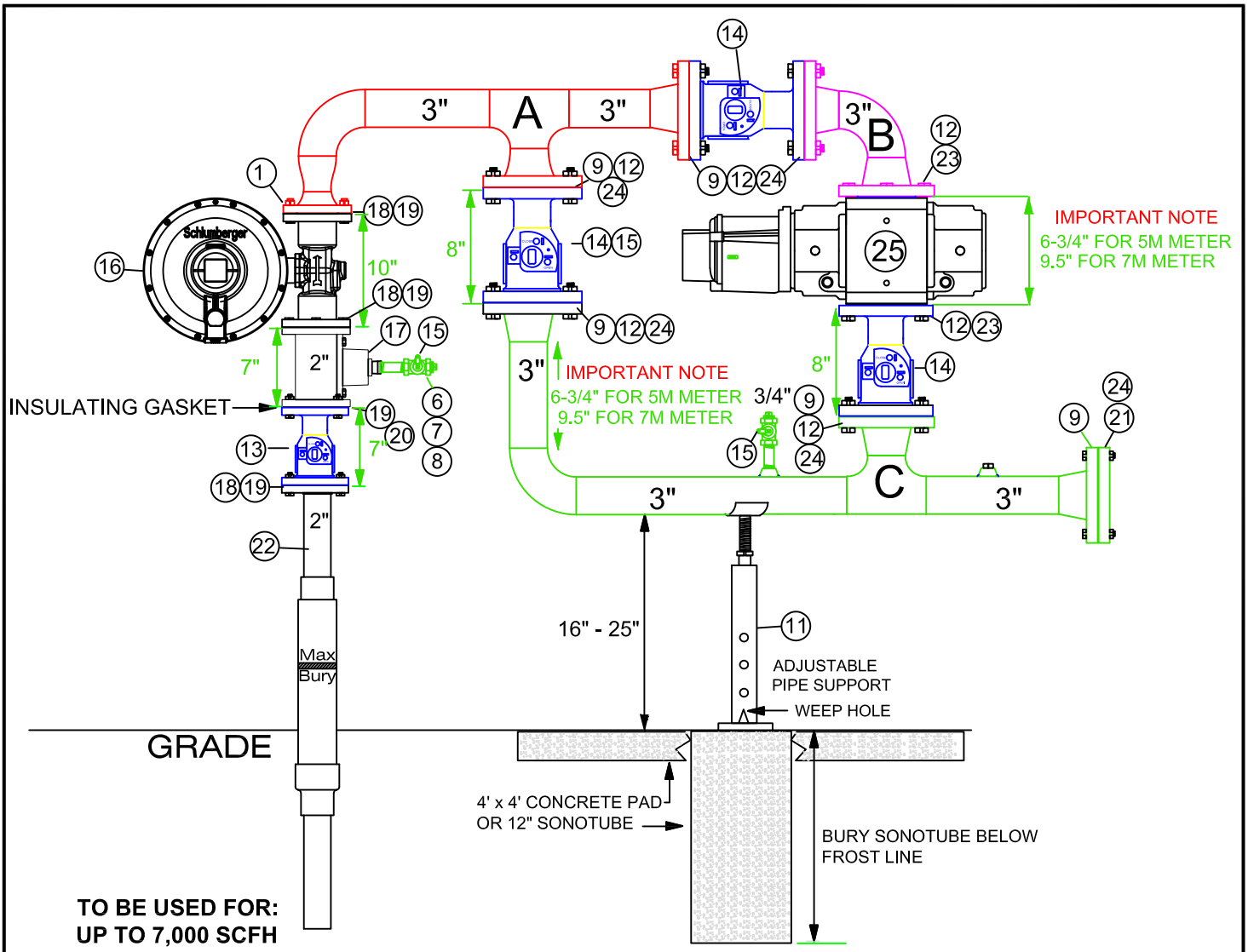
A. CONTACT ENGINEERING FOR REGULATOR SIZING.
B. WHERE VEHICLE TRAFFIC IS A CONCERN, PROTECTION POST ARE REQUIRED. NATIONAL GRID PROTECTION POST STANDARDS MTRS-6060 CAN BE USED AS A GUIDELINE.
C. DO NOT WELD METER OR REGULATOR IN PLACE.
D. DO NOT PRESSURE TEST WITH METER OR REGULLATOR IN PLACE. THIS CAN DAMAGE THE METER OR REGULATOR. USE A SPOOL PIECE.
E. 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.
F. THIS PREFAB CAN BE USED FOR LOW PRESSURE INSTALLATIONS; HOWEVER, METER RATING IS REDUCED FOR LOW PRESSURE (2,580 SCFH FOR 3m) PER CMS03002

PREFABRICATION NOTES FOR ITEMS 1- 9

G. ALL WELDING MUST CONFORM TO API-1104 PROCEDURES.
H. RADIOGRAPH SHALL BE 10% OF ALL WELDS OR PER NATIONAL GRID'S WELDING POLICY PROCEDURE.
I. ALL FLANGE OPENINGS SHALL BE COVERED WITH PLASTIC CAPS.
J. ASSEMBLY SHALL BE SUPPLIED IN 4 PIECES (3 PIPING & 1 FOR SUPPORT).
K. FITTINGS SHALL CONFORM TO ASTM A-234 WPB STD. WALL AND ASTM A-105.
L. PIPING SHALL CONFORM TO NATIONAL GRID SPEC. 120020-MS.
M. ALL PIPING SHALL BE PRESSURE TESTED TO 90 PSIG FOR 5 MINUTES OR PER NATIONAL GRID'S PRESSURE TESTING PROCEDURE.
N. ALL DIMESIONS OF PREFABRICATED PIECES MUST BE +/- .10 INCH. FLANGES MUST BE SQUARE/PARALLEL TO +/- .10 INCH AND BOLT HOLES MUST ALLIGN.

BILL OF MATERIAL

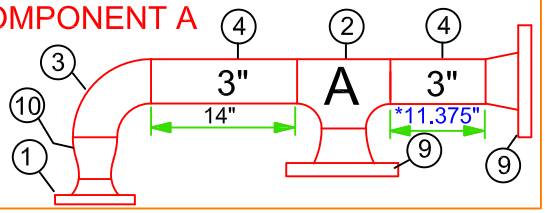
ITEM	DESCRIPTION	SAP ITEM ID MASS	SAP ITEM ID UNY & RI	QTY	MATERIAL NOTES
	PREFABRICATED ITEMS 1 – 8 LISTED BELOW				
1	FLANGE 2" WELD NECK FLAT FACE	9312322	9312322	10	PER ASTM A-1O5 GR. B OR A-350 LF-2
2	TEE 2", WELD END STD. WALL PER A-234 WPB	9315625	9315625	2	
3	ELBOW 2" WELD END 90 DEG. LONG RADIUS	9315522	9315522	3	4801246 IN R.I. STD WALL, PER A-234 WPB
4	PIPE 2" STEEL, STD. WALL (SCH. 40)	9340729	9312351	6'	PER A-106 GR. B OR API 5L GR. B
5	THRED-O-LET ¾"X 2" PIPE 3000#	9341652	9311035	2	PER A-105 GRADE B
6	NIPPLE ¾" X 3" LONG	9340631	9315390	2	
7	VALVE ¾" LOCKWING, TAMPER PROOF	9339593	9312257	2	
8	PLUG ¾" SOLID STEEL OR CI	9312288	9312288	3	
	OR PREFABRICATED COMPLETED COMPONENTS:				
A	2 INCH FLANGED REGULATOR OUTLET PIECE	9352442	9306734	1	
B	FLANGED ELBOW	9383780	9306733	1	
C	FLANGED METER OUTLET PIECE	9352443	9306732	1	
D	SPOOL PIECE 8C, 1.5M OR 3M METER 2" X 6.75"	9352024	NA	1	
	REMAINING ITEMS 9 – 20				
9	PIPE SUPPORT ADJUSTABLE 23"-35" HEIGHT	9391559	9314079	1	FOR ADDITIONAL SUPPORTS SEE
	OR PIPE SUPPORT ADJUSTIBLE FROM 12" – 24"	9391870	-	1	MTRS-6475
10	VALVE – 2" BALL VALVE CLASS 150# FLANGED ENDS	9306256	9306256	4	
11	LOCK – BARREL FOR MASSACHUSSETS	9322647	9312477 UNY	3	9311168 FOR RI
	LOCK – BARREL FOR LONG ISLAND AND NY CITY	9386860			
12	REGULATOR 2" ACTARIS B34IMRV FLANGED ENDS	AS REQ'D	9202214	1	FOR REGULATORS MUST BE SIZED FOR THE
	3/8" ORIFICE GREEN/WHITE SPRING 5.5" – 7.2" W.C.	-			FULL CAPACITY AT MINIMAL OPERATING
	SET AT 7" W.C. (100 PSIG MAX INLET) OR	-			PRESSURES AND MUST BE RATED FOR THE MAX
	ACTARIS B38 IMRV	9307989 MA/RI	9307989		OPERATING PRESSURE. CONTACT
	AMERICAN 1843 WITH OPSO	9323055 MASS			ENGINEERING.
	FISHER CS-806	9393158 MASS			
	FISHER CS800IQ	9391005 MASS			
13	STRAINER 2" FLANGED	9340158	9306282	1	
14	GASKET 2" FULL FACE FOR 150# FF FLANGE	9333167	9315688	11	
15	BOLTS STUD – 5/8" X 1.5 TO 2-1/4" W/2H HEX NUT	9392186	9392186	48	
16	INSULATING FLANGE KIT / GASKET 150#	9340992	9312579 UNY	1	FLEXITALLIC SIGMA 588 PINK
17	FLANGE, BLIND 2", CLASS 150# FF	9382074	9308662	1	9306269 & 9310614 FOR RI
18	RISER 2"	Field	Field	1	9308162 IN RI
19	BOLTS FOR METER 5/8" X 1.5" LONG	9342412	Meter Ops.	8	
20	METER 8C, 1.5M OR 3M TEMPERATURE CORRECTED	Meter Ops.	Meter Ops.	1	



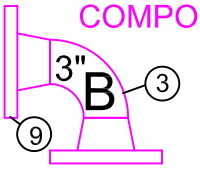
TO BE USED FOR:
UP TO 7,000 SCFH
7", 14" OR 1 PSIG OUTLET

PREFAB COMPONENTS

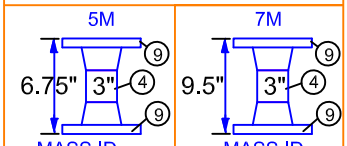
MASS ID 9352013
RI / UNY ID 9306731
COMPONENT A



MASS ID 9352544
RI / UNY ITEM ID 9306730
COMPONENT B



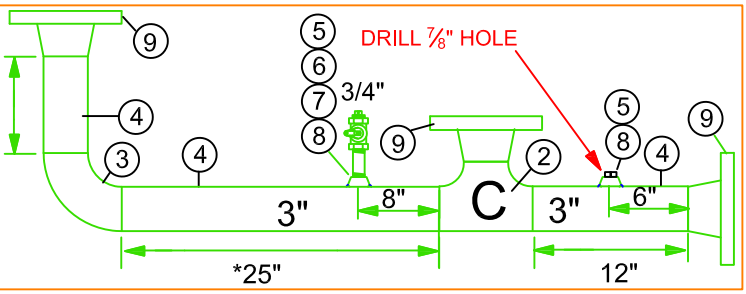
5M AND 7M METER SPOOL PIECE
COMPONENT D



COMPONENT C

IMPORTANT NOTE
6-3/4" FOR 5M METER
9.5" FOR 7M METER

5M MASS ID 9352572
7M MASS ID 9352499
5M RI / UNY ID 9306729
7M RI / UNY ID 9306735



* ALL DIMENSIONS ARE BASED ON WELD NECK FLANGES, 3/32" WELD GAP AND 1/16" THICK GASKETS

nationalgrid

ALL REGIONS

5M AND 7M PREFAB METER HEADER

REVISIONS: REVISED ITEMS ID TO SAP ID'S

DATE:	03/26/2010	EFFECTIVE DATE:	05/5/2020
DESIGN:	B. FOSTER/P. GUGLIOTTA	STD. DWG. NO.	020011-CS
DRAWN:	B. FOSTER/P. GUGLIOTTA		

INSTALLATION NOTES

A. CONTACT ENGINEERING FOR PROPER 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.

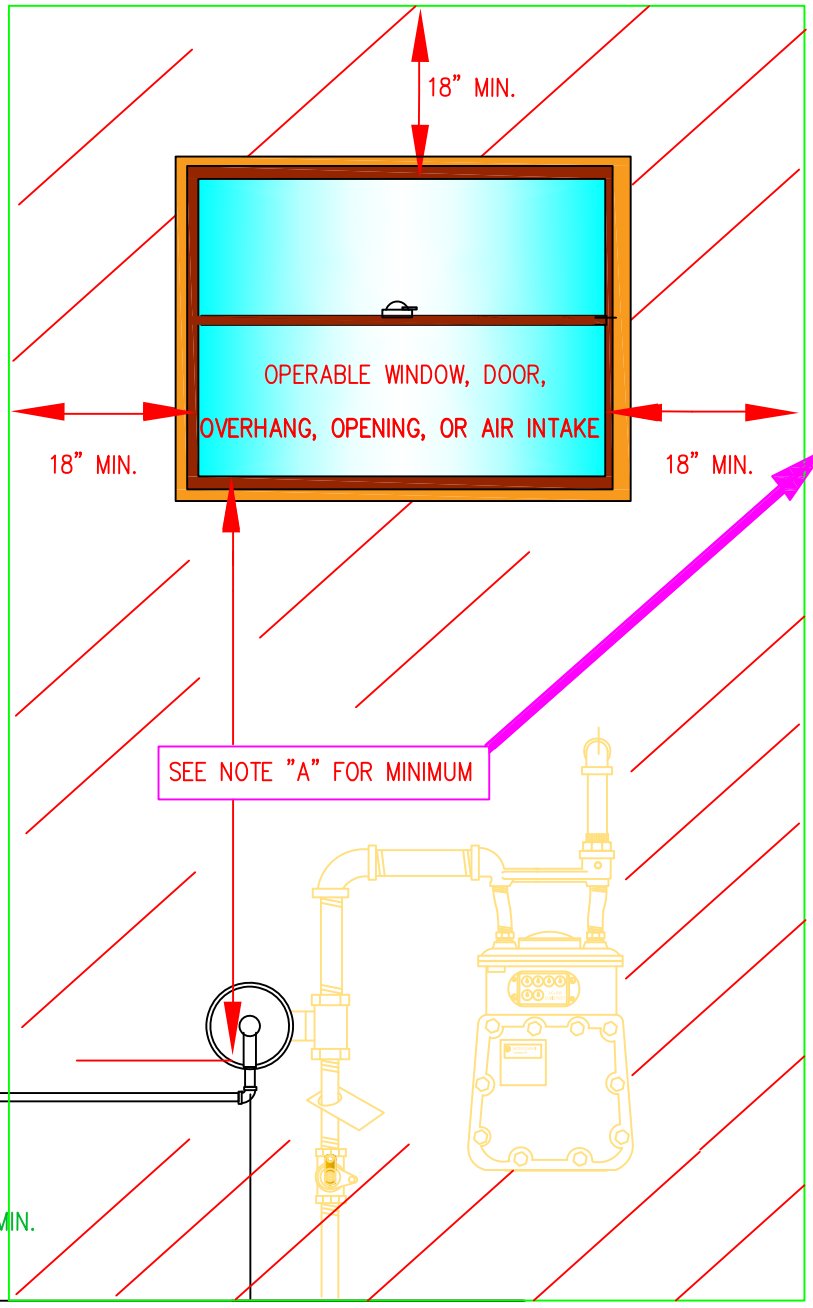
PREFABRICATION NOTES FOR ITEMS 1- 11

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).
J. FITTINGS SHALL CONFORM TO ASTM A-234 WPB STD. WALL AND ASTM A-105.
K. PIPING SHALL CONFORM TO NATIONAL GRID SPECIFICATION 120020-MS.
L. ALL DIMESIONS OF PREFABRICATED PIECES MUST BE +/- .10 INCH. FLANGES MUST BE SQUARE/PARALLEL TO +/- .10 INCH AND BOLT HOLES MUST ALLIGN.

BILL OF MATERIAL

ITEM	DESCRIPTION	SAP ITEM ID LI, NYC, MASS.	SAP ITEM ID UNY, RI	QTY	MATERIAL NOTES
	PREFABRICATED ITEMS 1 – 10 LISTED BELOW				
1	FLANGE 2" WELD NECK FLAT FACE CLASS 150#	9314322	9314322	1	PER ASTM A-1O5 GR. B OR A-350 LF-2
2	TEE 3", WELD END STD. WALL PER A-234 WPB	9307680	9307680	2	
3	ELBOW 3" WELD END 90 DEG. LONG RADIUS	9315471	9315471	3	STANDARD WALL, PER A-234 WPB
4	PIPE 3" STEEL, STD. WALL (SCH. 40)	9340818	9310244	5'	PER A-106 GR. B
5	THRED-O-LET ¾"X 3"PIPE 3000#	9341652	9311035	3	PER A-105 GRADE B
6	NIPPLE ¾" X 3" LONG	9340631	9315390	2	
7	VALVE ¾" LOCKWING, TAMPER PROOF	9339593	9312257	2	
8	PLUG ¾" SOLID STEEL OR C.I.	9312288	9312288	3	
9	FLANGE 3" WELD NECK FLAT FACE CLASS 150#	9314431	9314431	9	PER ASTM A-1O5 GR. B OR A-350 LF-2
10	REDUCER 3" X 2" CONC., STD. WALL, WELD END	9315489	9315489	1	PER ASTM A234-WPB
	OR PREFABRICATED COMPLETED COMPONENTS				
A	2" X 3" FLANGED REGULATOR OUTLET	9352013	9306731	1	
B	3" FLANGED ELBOW	9352544	9306730	1	
C 5M	5M FLANGED METER OUTLET OR	9352572	9306729	1	
C 7M	7M FLANGED METER OUTLET	9352499	9306735	1	
D 5M	5M FLANGED SPOOL PIECE	9359171	NA	1	
D 7M	7M FLANGED SPOOL PIECE	9385893	NA	1	
	REMAINING ITEMS 11 - 25				
11	PIPE SUPPORT 12"-24"	9323920 MA	9314079	1	FOR ADDITIONAL SUPPORTS SEE MTRS-6475
	PIPE SUPPORT 12"-24"	9391870 LI	Incl. above		
12	GASKET 3" CLASS 150# RING TYPE	9341162	9312067	8	FLEXITALLIC SIGMA 588 WHITE OR APPROVED EQ.
13	VALVE – 2" BALL VALVE CLASS 150# FLANGED ENDS	9306256	9306256	1	
14	VALVE - 3" BALL VALVE CLASS 150# FLANGED ENDS	9306255	9306255	3	
15	LOCK BARREL	9322647 MA	9312477 UNY	3	9311168 IN RI
	LOCK CARREL NYC/LI	9386820 LI/NYC	-		
16	REGULATOR 2" FLANGED ENDS ITRON B34IMRV 3/8" ORIF. 100 PSIG MAX 7" SET OR ITERON B38 IMR AMERICAN 1843 WITH OPSO FISHER CS-803 FISHER CS-806 FISHER CS-804 WITH VSX SLAM SHUT	AS REQ'DS REQ'D By Eng	9307971 By Eng.	1	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.
17	STRAINER 2" FLANGED	9340158	9306282	1	
18	GASKET 2" RING FOR 150# FF FLANGE	9341161	9315688	3	
19	BOLTS STUD – 5/8" X 4" LONG WITH 2 HEX NUT	9392186	9392186	16	ALT. 9306269 FOR BOLT / 9310614 FOR NUT IN RI
20	INSULATING FLANGE KIT / GASKET 150#	9340992	9312579 UNY	1	9308162 IN RI
21	FLANGE BLIND 3"	9307751	9307751	1	
22	RISER 2"	By Field	By Field	1	
23	BOLTS FOR METER 5/8" X 1.5" LONG	9342412	Meter Ops	8	
24	MACHINE STUD, 5/8" X 4" LONG WITH HEX NUT	9392186	9392186	32	ALT. 9310616 FOR BOLT / 9310614 FOR NUTIN RI
25	METER 5M OR 7M TEMPERATURE CORRECTED	Meter Ops	Meter Ops	1	

THIS DRAWING ONLY APPLIES TO THE VENT TERMINUS:
VENT TERMINUS SHALL NOT BE WITHIN SHADED AREA
SEE PAGE 2 FOR RESTRICTIONS.



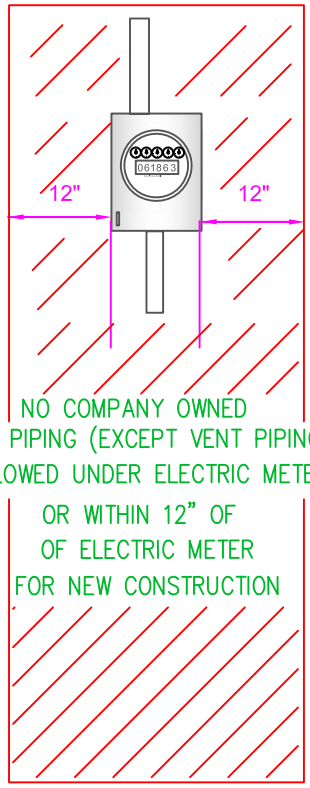
ONE OF THE FOLLOWING MINIMUM DISTANCES FROM A REGULATOR VENT TO AN OPERABLE WINDOW (ACTUAL OPENING - NOT TO WINDOW TRIM), DOOR, OVERHANG, OPENING, OR AIR INTAKE SHALL BE MET

18" HORIZONTAL OR
18" ABOVE OR
VERTICAL DISTANCE PER NOTE "A"

NOTE "A" - MINIMUM VERTICAL DISTANCES IF 18" HORIZONTAL CAN'T BE MET

OPERABLE WINDOW / DOOR: 6 FEET
OVERHANG PROTRUDES GREATER THAN 24": 6 FEET
ANY EXHAUST OPENING: 6 FEET
AIR INTAKE: 10 FEET

ELECTRIC METER



NO COMPANY OWNED GAS PIPING (EXCEPT VENT PIPING) ALLOWED UNDER ELECTRIC METER OR WITHIN 12" OF OF ELECTRIC METER FOR NEW CONSTRUCTION

nationalgrid ALL REGIONS	REGULATOR VENT CLEARANCES FOR RESIDENTIAL OUTDOOR LOCATION	
Key Changes: REVISED STANDARD	DATE: 11/15/2021	EFFECTIVE DATE: 11/15/2021
	DESIGN: B. FOSTER	STD. DWG. NO. 020013-CS
	DRAWN: PAUL GUGLIOTTA	

DEFINITIONS:

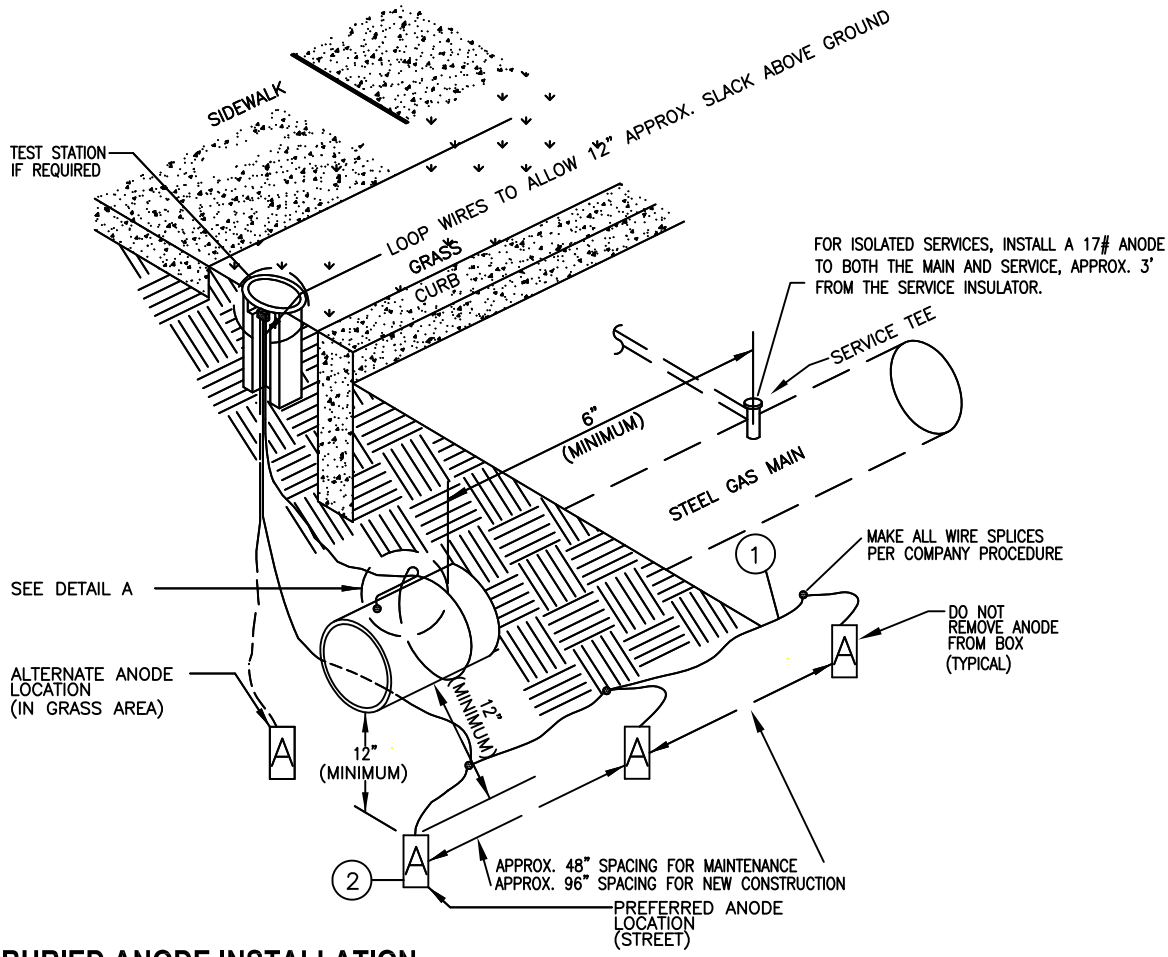
- SHALL – Indicates a mandatory requirement
- SHOULD - Indicates best practice and is the action that is expected to be performed as described unless there is a compelling reason not to do so.

NOTES: For all new installations effective with the implementation of this standard, the following applies.

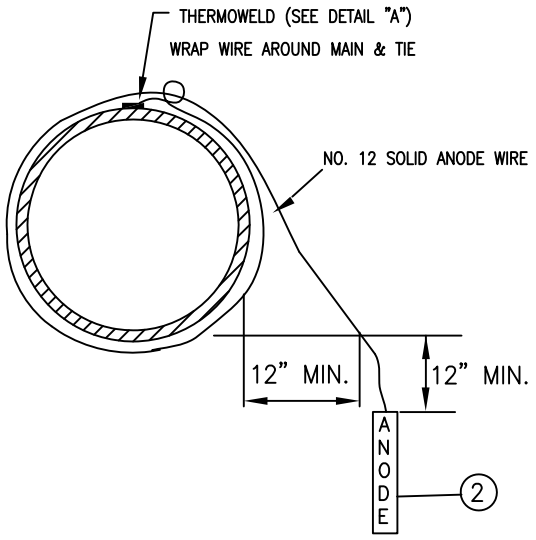
1. The minimum regulator vent height above Final Grade SHALL be 12 inches.
2. Regulators SHALL be installed with the regulator vent port pointing down. If the minimum vent height of 12 inches above final grade cannot be achieved, the vent SHALL be piped to at least the minimum height specified. (mulch, vegetation and loose impediments do not constitute final grade and are not part of the 12 inch clearance criteria)
3. Regulator vent piping SHALL be standard wall steel piping. Fittings such as elbows, tees and caps may be malleable iron.
4. Regulator vent piping SHALL be wrench tight and thread sealant SHALL be used during assembly.
5. Regulator vent piping SHALL be of the proper size. See CMS03002 for sizing.
6. Regulator vent piping SHOULD contain a fitting (e.g., Lock Type Dresser Style 90, insulated union, etc.) to facilitate disassembly of the vent piping and regulator replacement on OUTDOOR regulator installations where the vent piping exceeds approximately 6 feet (72 inches) in length.
7. Regulator vent piping in the excess of 36 inches total length SHALL be supported with at least one support.
8. When vent pipe exceeds lengths given below, additional support is required. For guidance on support requirements see NFPA 54: section 7.2.5.1 and NFPA Table: 7.2.5.2 this guidance is also available in the Gas Pipeline Technical Committee (GPTC) guidance 192.353

TABLE FOR PIPE SUPPORT SPACING			
STEEL PIPE - NOMINAL SIZE IN INCHES	SPACING SUPPORT IN FEET	TUBING – NOMINAL SIZE IN INCHES	SPACING SUPPORT IN FEET
1/2	6	1/2	4
3/4 or 1	8	5/8 or 3/4	6
1-1/4 or larger (horizontal)	10	7/8 or 1 (horizontal)	8
1-1/4 or larger (vertical)	every floor	1 or larger (vertical)	every floor

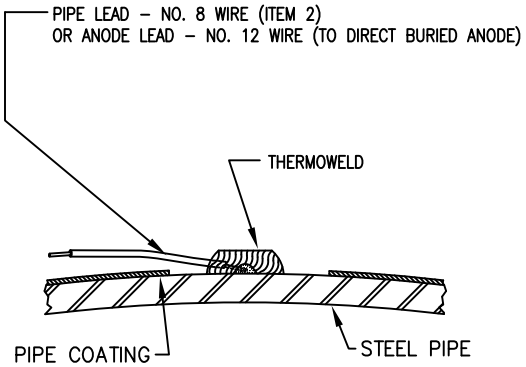
9. Regulator vent terminus SHALL contain a weather-insect resistant fitting
10. Regulator vent terminus SHALL be marked as a VENT
11. Regulator vent terminus SHALL be located where gas from the vent can escape freely into the atmosphere and SHALL meets the requirements shown on page 1 of 2.
12. Regulator vent terminus SHALL be protected from damage caused by submergence in area where flood and ice accumulation may occur.
13. For existing installations, any substandard condition SHOULD be brought into compliance, at the time of discovery, or referred to the appropriate CMS or Field Operations department for remediation in accordance with Handling Gas Facilities Found in Substandard Locations CMS05001
14. If an overhang protrudes less than 24 inches, there are no minimum distances.



DIRECT BURIED ANODE INSTALLATION



NOTE: INSTALL ANODE 3 FT. MIN. FROM ANY ISOLATED FITTING



DETAIL "A"

nationalgrid

ALL REGIONS

INSTALLATION OF MAGNESIUM ANODES

REVISIONS: REVISED USING NEW SP ITEM ID'S

DATE: 07/15/2010	EFFECTIVE DATE: 09/15/2013
DESIGN: PG	STD. DWG. NO. 030024-CS
APPROVAL: PS	

MATERIAL LIST

	Description	Down State NY Item I.D	Upstate NY Item I.D	New England Item I.D	Rhode Island Item I.D	MATERIAL NOTES
1	CABLE NO. 8 – 1/C	9334425	9311214	9334425	9311214	Upstate and RI cable has 19 strands
2	ANODE, MAGNESIUM 17 LB	9339399	9311183	9339399	9311183	
3	ANODE, MAGNESIUM 3 LB	9339401	9315645	9339401	9315645	Use on Tracer wire and all isolated fittings.
4	ANODE, MAGNESIUM SPIKE 3 LB	9339400	9308624	9339400	9308624	Use on Service Risers ONLY
*	CLAMP, GROUNDING 1/2IN - 1IN DIA.	9386535	9386544	9386535	9386544	Grounding clamp for attaching spike anode lead wire to service riser
*	CLAMP, GROUNDING 1-1/4IN - 2IN DIA.	9331633	9386559	9331633	9386559	Grounding clamp for attaching spike anode lead wire to service riser

* Spike Anode Ground Clamp

Below Grade (In order of Preference)

Type of Facility	**Required Coating Factory Applied**	**Girth Weld Joint 6" and Smaller**	**Girth Weld Joint 8" and Larger**	**Holiday's & Damaged Coatings**	**Valves & Large Diameter Fittings***	**Small Diameter Fittings & Services***
New Distribution & Temporary Pipelines (direct bury or bores/missile	PE Coating (40 mils minimum)	**1.** Cold Applied Tape **2.** Shrink Sleeves **3.** Wax Tape (wet conditions)	**1.** Shrink Sleeves **2.** Cold Applied Tape **3.** Wax Tape (wet conditions)	**1.** Cold Applied Tape **2.** Repair Patch **3.** Wax Tape (wet conditions)	**1.** Wax Tape **2.** Cold Applied Tape	**1.** Moldable Tape **2.** Cold Applied
New Transmission	Fusion Bonded Epoxy 16 mils minimum **or** PE Coating – 40 mils minimum	Two Part Epoxy **or** **1.** Cold Applied Tape **2.** Shrink Sleeves **3.** Wax Tape (wet conditions)	Two Part Epoxy **or** **1.** Shrink Sleeves **2.** Cold Applied Tape **3.** Wax Tape (wet conditions)	Two Part Epoxy **or** **1.** Cold Applied Tape **2.** Wax Tape (wet conditions)	Two Part Epoxy **or** **1.** Cold Applied Tape	Two Part Epoxy **or** **1.** Moldable Tape **2.** Cold Applied
Directional Drill	FBE 16 mils minimum plus minimum of 40 mils of Abrasion resistant Epoxy	**1.** Abrasion Resistant Epoxy **2.** Directional Drill Shrink Sleeve	**1.** Abrasion Resistant Epoxy **2.** Directional Drill Shrink Sleeve	**1.** Abrasion Resistant Epoxy **2.** Directional Drill **3.** Shrink Sleeve	N/A	N/A
	PE Coating – 80 mils minimum	Direction Drill Shrink Sleeve	Direction Drill Shrink Sleeve	Direction Drill Shrink Sleeve		N/A
Existing PE Coating	Not Applicable – Existing	**1.** Cold Applied Tape **2.** Shrink Sleeves **3.** Wax Tape (wet conditions)	**1.** Shrink Sleeves **2.** Cold Applied Tape **3.** Wax Tape (wet conditions)	**1.** Cold Applied Tape **2.** Wax Tape (wet conditions)	**1.** Wax Tape **2.** Cold Applied Tape	**1.** Wax Tape **2.** Moldable Tape
Existing Coal Tar	Not Applicable – Existing	Wax Tape	Wax Tape	Wax Tape	Wax Tape	Wax Tape
Existing FBE (Fusion Bonded Epoxy)	Not Applicable – Existing	**1.** Two Part Epoxy **2.** Cold Applied Tape **3.** Wax Tape (wet conditions)	**1.** Two Part Epoxy **2.** Shrink Sleeves **3.** Wax Tape (wet conditions)	**1.** Two Part Epoxy **2.** Cold Applied Tape **3.** Wax Tape (wet conditions)	**1.** Two Part Epoxy **2.** Wax Tape **3.** Cold Applied Tape	**1.**Two Part Epoxy **2.** Moldable Tape **3.** Wax Tape
Existing Bare	Not Applicable – Existing	Coat Cleaned area with Wax Tape	Coat Cleaned area with Wax Tape	Coat Cleaned area with Wax Tape	Coat Cleaned area with Wax Tape	Coat Cleaned area with Wax Tape
Key Hole/Coring Technology	Not Applicable – Existing	**1.** Wax Tape Patch **2.** Mastic	**1.** Wax Tape Patch **2.** Mastic	**1.** Wax Tape Patch **2.** Mastic	**1.** Wax Tape Patch **2.** Mastic	**1.** Wax Tape Patch **2.** Mastic

* Factory applied shop primer shall be considered bare and must be field coated.
* Epoxy coated fittings shall have damaged coating repaired.
* Surface Preparation shall be completed per manufacturers instructions

nationalgrid ALL REGIONS

Facility
Coating Guide

REVISIONS: Merged sap item id's on Page 3

DATE: 04/15/ 2010
DESIGN: cs
APPROVED: PS

EFFECTIVE DATE: 3/22/2020
STD. DWG.

030031-CS

Above Grade (In order of Preference)

Type of Facility	Required Coating	Joints 6" and Smaller	Joints 8" and Larger	Holiday's & Damaged Coatings	Valves & Large Diameter Fittings*	Small Diameter Fittings & Services*	Meter Piping
New Bare (plant, regulator. pits, facility)	**1**. Epoxy **2**. Rust Protective Enamel	**1**. Epoxy **2**. Rust Protective Enamel	**1**. Epoxy **2**. Rust Protective Enamel	**1**. Epoxy **2**. Rust Protective Enamel	**1**. Epoxy **2**. Rust Protective Enamel	**1**. Epoxy **2**. Rust Protective Enamel	**1**. Epoxy **2**. Rust Protective Enamel
New Bridges, Culverts & Temporary Pipelines	**1.** FBE 16 mils minimum plus minimum of 25 mils of Abrasion resistant Epoxy **2.** PE Coating – 65 mils minimum	**1.** Epoxy **2.** Shrink Sleeves **3.** Cold Applied Tape **4.** #2 or #2A Wax Tape	**1.** Epoxy **2.** Shrink Sleeves **3.** Cold Applied Tape **4.** #2 or #2A Wax Tape	**1.** Epoxy **2.** Shrink Sleeves **3.** Cold Applied Tape **4.** #2 or #2A Wax Tape	**1.** Epoxy **2.** #2 or #2A Wax Tape **3.** Cold Applied Tape	**1.** Epoxy **2.** #2 or #2A Wax Tape **3.** Cold Applied Tape	N/A
Transition Zone (New and Existing)	**1.** Cold Applied Tape **2.** #2 or #2A Wax Tape (Apply minimum 3 " over sound coating)	N/A	N/A	**1.** Cold Applied Tape **2.** #2or #2AWaxTape (Apply minimum 3 " over sound coating)	N/A	**1.** Cold Applied Tape **2.** #2 or #2A Wax Tape (Apply minimum 3 " over sound coating)	**1.** Cold Applied Tape **2.** #2or #2AWax Tape (Apply minimum 3 " over sound coating)
Existing PE Coating	Not Applicable – Existing PE coated	**1.** Shrink Sleeves **2.** Cold Applied Tape **3.** #2 or #2A Wax Tape	**1.** Shrink Sleeves **2.** Cold Applied Tape **3.** #2 or #2A Wax Tape	**1.** Shrink Sleeves **2.** Cold Applied Tape **3.** #2 or #2AWax Tape	**1.** Epoxy **2.** Rust Protective Enamel **3.** #2 or #2A Wax Tape	**1.** Epoxy **2.** Rust Protective Enamel **3.** #2 or #2A Wax Tape	**1.** Rust Protective Enamel **2.** #2 or #2A Wax Tape **3.** Epoxy
Existing Coal Tar	Not Applicable – Existing Coal Tar Coated	#2 or #2A Wax Tape	#2 or #2A Wax Tape	#2 or #2A Wax Tape	**n/a**	**n/a**	**1.** Rust Protective Enamel **2.** #2 or #2A Wax Tape
Existing Abrasion resistant Epoxy with Fusion Bonded Epoxy	Not Applicable – Existing FBE coated	**1**. Epoxy **2**. Cold Applied Tape **3**. #2 or #2A Wax Tape	**1**. Epoxy **2**. Shrink Sleeves **3**. Cold Applied Tape **4**. #2 or #2A Wax Tape	**1**. Epoxy **2**. Cold Applied Tape **3**. #2 or #2AWax Tape	**1**. Epoxy **2**. Rust Protective Enamel **3**. #2 or #2A Wax Tape	**1**. Epoxy **2**. Rust Protective Enamel **3**. #2 or #2A Wax Tape	**1**. Epoxy **2**. Rust Protective Enamel **3**. #2 or #2A Wax Tape
Existing Wax Tape	n/a	#2 or #2A Wax Tape	#2 or #2A Wax Tape	#2 or #2A Wax Tape	#2 or #2A Wax Tape	#2 or #2A Wax Tape	#2 or #2A Wax Tape
Existing Paint (regulator. pit)	n/a	**1**. Epoxy **2**. #2or #2AWax Tape	**1**. Epoxy **2**. #2 or #2AWax Tape	**1**. Epoxy **2**. #2 or #2A Wax Tape	**1**. Epoxy **2**. #2 or #2A Wax Tape	**1**. Epoxy **2**. #2 or #2A Wax Tape	**1**. Epoxy **2**. #2 or #2A Wax Tape
Existing Paint (non regulator pit)	n/a	**1**. Rust Protective Enamel **2**. #2 or #2A Wax Tape **3**. Epoxy	**1**. Rust Protective Enamel **2**. #2 or #2A Wax Tape **3**. Epoxy	**1**. Rust Protective Enamel **2**. #2 or #2A Wax Tape **3**. Epoxy	**1**. Rust Protective Enamel **2**.#2 or #2A Wax Tape **3**. Epoxy	**1**. Rust Protective Enamel **2**. #2 or #2A Wax Tape **3**. Epoxy	**1**. Rust Protective Enamel **2**. #2 or #2A Wax Tape **3**. Epoxy

* Factory applied shop primer shall be considered bare and must be field coated.

* Epoxy coated fittings shall have damaged coating repaired.

* Surface Preparation shall be completed per manufacturers instructions

Material List *
Coating Systems for New Construction and Maintenance

* All materials must be approved by Corrosion Control Section of System Integrity and Materials and Standards section of Standards and Policies

Cold Applied Tape, Primer & Repair Pads

DESCRIPTION	Downstate NY Item I.D	Upstate NY Item I.D	New England Item I.D	Rhode Island Item I.D	MATERIAL NOTES
Primer	9384297	9384297	9384297	9384297	Gallon , Above/Below Grade
2" moldable Tape	9384295	9384295	9384295	9384295	25 ft roll, Below Grade
2" Tape	9315630	9315630	9315630	9315630	75 f t roll, Above/Below Grade
4" Tape	9315629	9315629	9315629	9315629	75 f t roll, Above/Below Grade
6" Tape	9314898	9314898	9314898	9314898	75 f t roll, Above/Below Grade
Repair Patch	9308094	9308094	9308094	9308094	6" x 6" Pad, Below Grade

Wax Tape

DESCRIPTION	Downstate NY Item I.D	Upstate NY Item I.D	New England Item I.D	Rhode Island Item I.D	MATERIAL NOTES
#1 Primer	9314352	9314352	9314352	9314352	Gallon, Below Grade
#2a Primer (white)	9332480	9314354	9332480	9314354	Gallon, Above Grade, Temp-Coat 3000
#2 Primer (brown)	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Gallon, Above Grade
#1 tape (brown) 4" in NYC/LI/MA: 6" in RI	4" 9341928	6" 9314336	4" 9341928	6" 9314336	9 ft roll, Below Grade
#2a tape (grey) 4" in NYC/LI/MA: 6" in RI	4" 9341927	6" 9314335	4" 9341927	6" 9314335	9 ft roll, Above Grade
#2 tape (brown)	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Above Grade
6" Overwrap	9386395	Non-Stock	Non-Stock	Non-Stock	50 ft roll, Below Grade

Rust Protective Enamel

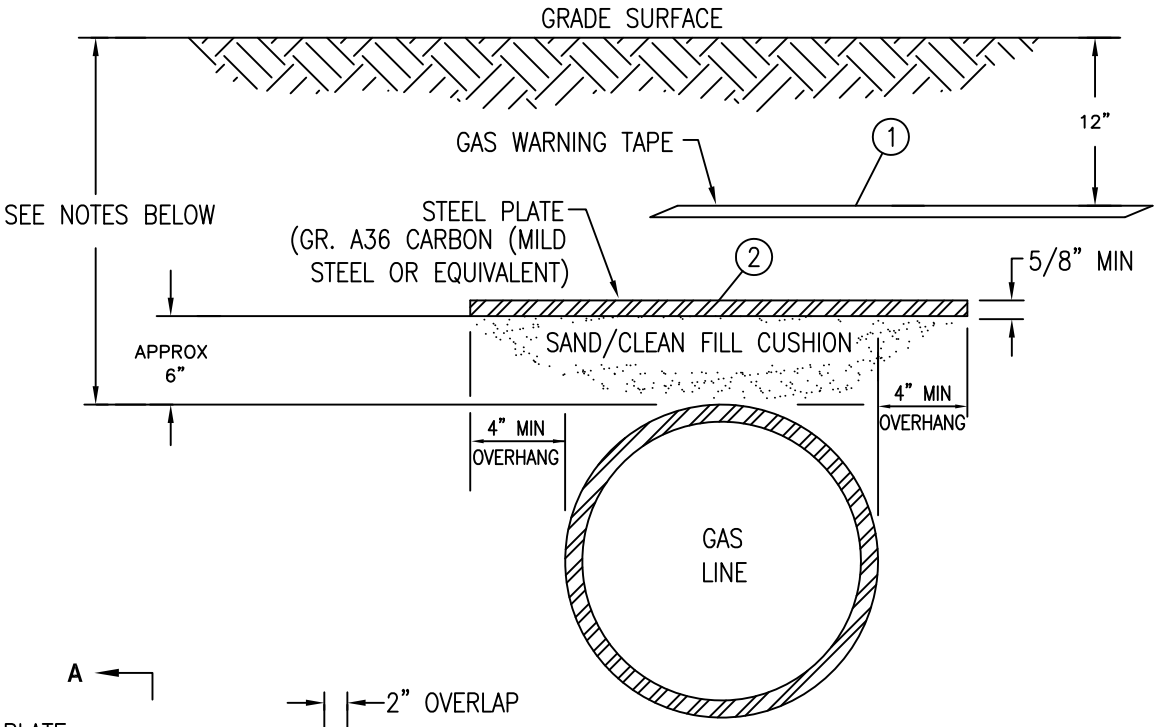
DESCRIPTION	Downstate NY Item I.D	Upstate NY Item I.D	New England Item I.D	Rhode Island Item I.D	MATERIAL NOTES
Brush-on Enamel Above Grade ONLY	9324504	9314485	9324504	9314485	Gallon, Grey
Aerosol	9325991	Non-Stock	9325991	Non-Stock	Aerosol, Above Grade

Epoxy Brush Applied

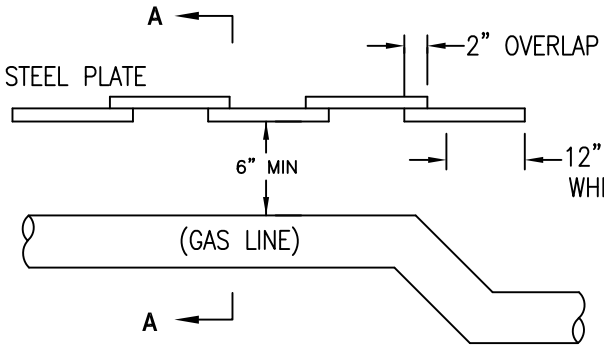
DESCRIPTION	Downstate NY Item I.D	Upstate NY Item I.D	New England Item I.D	Rhode Island Item I.	MATERIAL NOTES
FBE Touch-up Epoxy	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Below Grade Only R95 or equivalent
2-Part Epoxy (Below Grade ONLY, abrasion resistant)	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Below Grade R95 or equivalent
2-Part Epoxy (Above Grade ONLY)	9390147	9390147	9390147	9390147	Above Grade Only Approved 2-part epoxy

KeyHole Coating

DESCRIPTION	Downstate NY Item I.D	Upstate Item I.D	New England Item I.D	Rhode Island Item I.D	MATERIAL NOTES
Keyhole Patch Pad	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Purchase from UPSCO
Keyhole Applicator Tool	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Purchase from UPSCO
Keyhole Finishing Tool	Non-Stock	Non-Stock	Non-Stock	Non-Stock	Purchase from UPSCO
Mastic, Brush Applied	Non-Stock	Non-Stock	Non-Stock	Non-Stock	TC Mastic (Tapecoat)



SECTION A-A



METHOD OF LAYING PLATES
ELEVATION

ITEM #	DESCRIPTION	ITEM ID
1	YELLOW BURIAL MARKER TAPE LI.MA/NYC	9341904
	YELLOW BURIAL MARKER TAPE R.I.	9310333
2	STEEL PLATE 5/8" X 24" X 24"	9325829
	STEEL PLATE 5/8" X 48" X 18"	9325830

PROTECTIVE PLATES ARE REQUIRED:

1. FOR ANY GAS TRANSMISSION LINE OPERATING IN EXCESS OF 125 PSIG AND HAVING LESS THAN THREE FEET (3') OF COVER.
2. FOR ANY GAS MAINS OPERATING AT LESS THAN 125 PSIG HAVING LESS THAN THREE FEET (3') OF COVER IN A STATE ROAD.
3. FOR ANY GAS MAINS OPERATING AT LESS THAN 125 PSIG HAVING LESS THAN TWO FEET (2') OF COVER IN A NON STATE ROAD.
4. FOR ANY SERVICE LOCATED IN THE PUBLIC RIGHT-OF-WAY HAVING LESS THAN EIGHTEEN INCHES (18") OF COVER.
5. FOR ANY SERVICE LOCATED IN PRIVATE PROPERTY HAVING LESS THAN TWELVE INCHES (12") OF COVER.

NOTES:

1. MAINS OR TRANSMISSION LINES INSTALLED WITH LESS THAN TWO FEET (2') OF COVER REQUIRE APPROVAL OF THE MASSACHUSETTS DPU.
2. MAINS OR TRANSMISSION LINES INSTALLED WITH LESS THAN THREE FEET (3') OF COVER IN MASSACHUSETTS STATE ROADWAYS/HIGHWAYS REQUIRE APPROVAL OF THE STATE AGENCY (E.G. MHD).
3. REFER TO NATIONAL GRID DOCUMENT CNST-5010 FOR REGULATORY COMPLIANCE REQUIREMENTS FOR SHALLOW MAIN AND SERVICE INSTALLATION (E.G. DTE WAIVER).
4. REFER TO ENG02001, ENG03001, & ENG04001 FOR ADDITIONAL DETAILS FOR GAS MAIN AND SERVICE INSTALLATIONS.
5. FIELD SUPERVISOR TO PROVIDE SKETCH (WHICH INCLUDES ALL DIMENSIONS AND TIES) OF THE NEWLY INSTALLED STEEL PLATE OVER GAS MAINS, TRANSMISSION LINES AND SERVICES.

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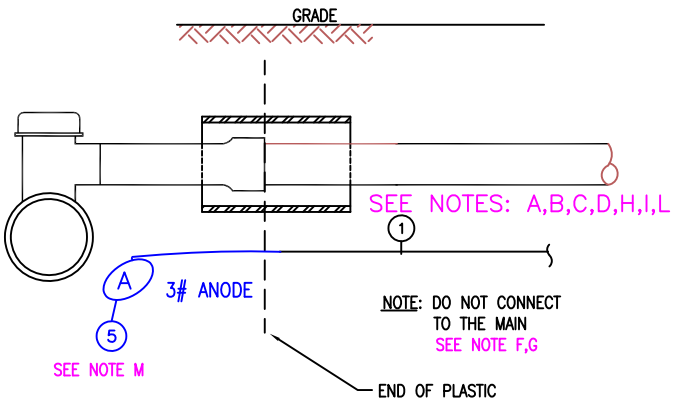
MASSACHUSETTS & RHODE ISLAND

PROTECTIVE STEEL PLATING FOR GAS MAINS AND SERVICES

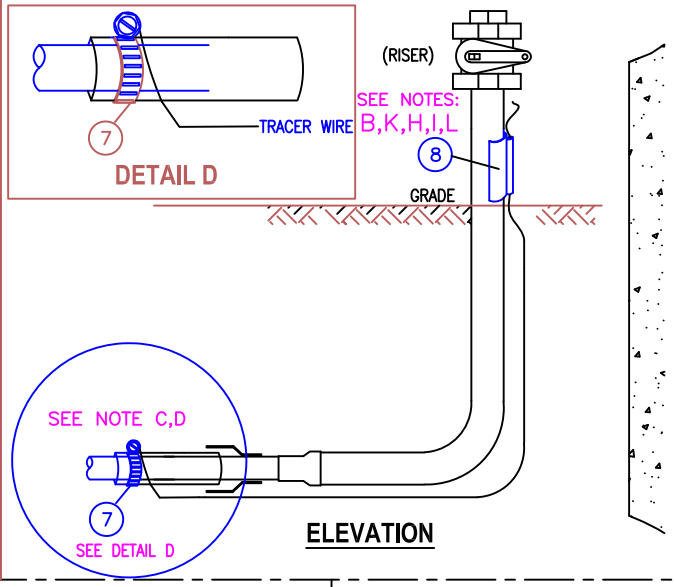
REVISIONS: MADE APPLICABLE TO RHODE ISLAND

DATE: 03/15/2019
DESIGN: W. FROMM
DRAWN: G. HURLEY / P.D.

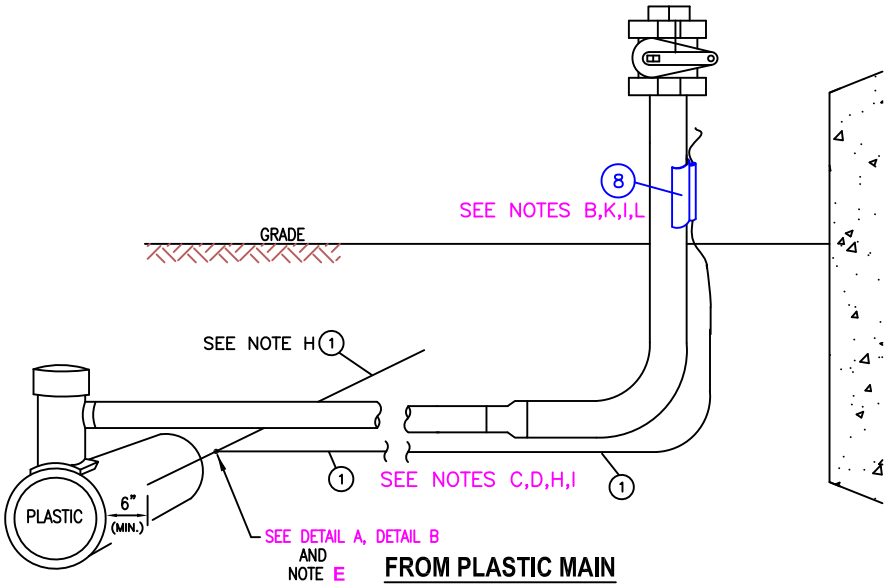
EFFECTIVE DATE: 10/31/2019
STD. DWG. NO. **CNST-6030-MA-RI**



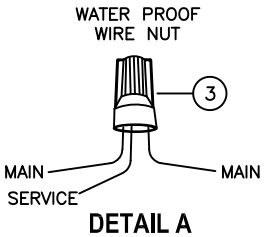
FROM STEEL OR CAST IRON MAIN



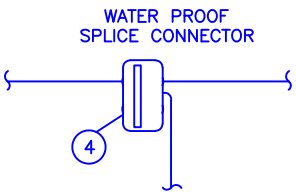
ELEVATION



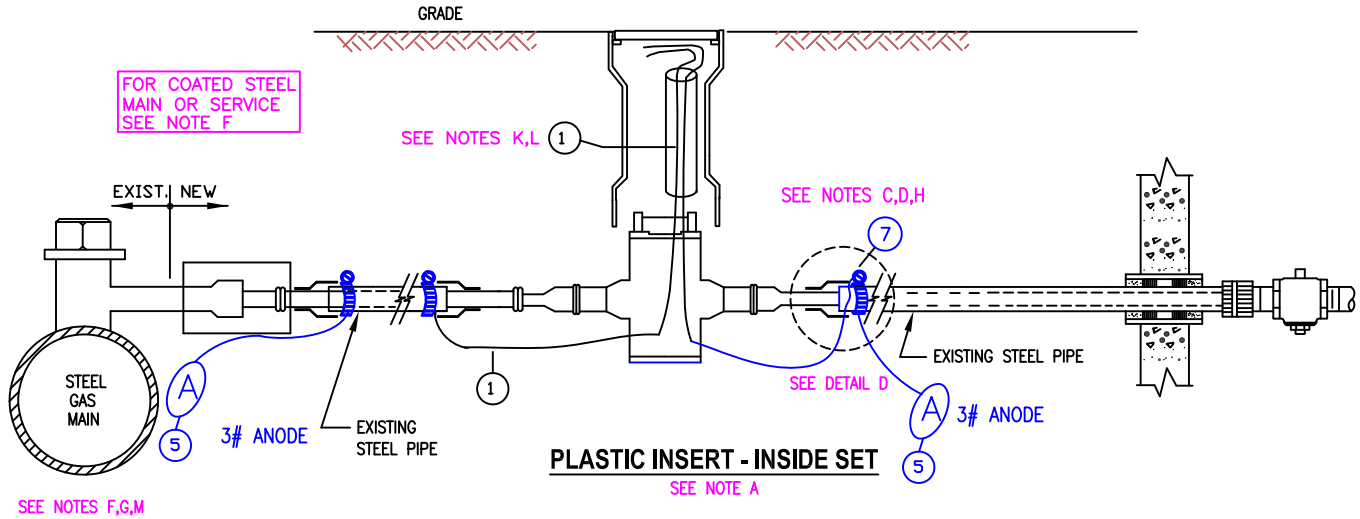
FROM PLASTIC MAIN



DETAIL A
SEE NOTE E



DETAIL B
SEE NOTE E



PLASTIC INSERT - INSIDE SET
SEE NOTE A

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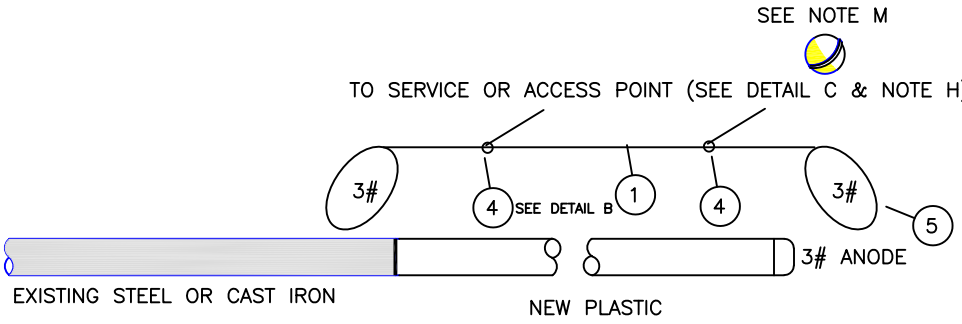
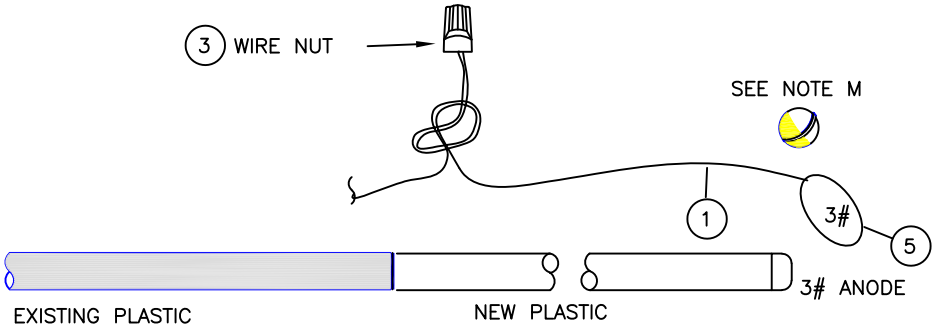
LI–MA–RI–UNY

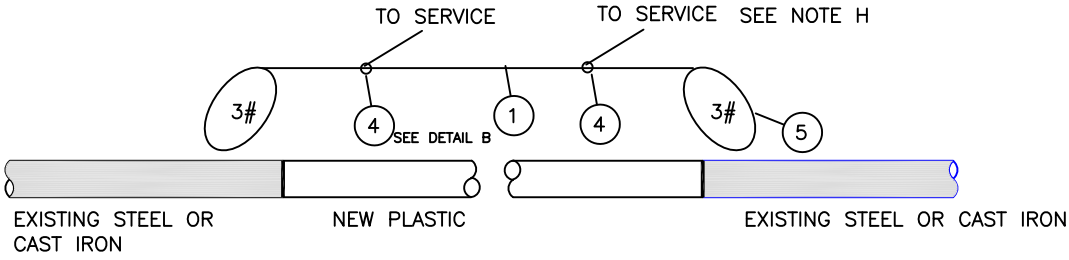
TRACER WIRE INSTALLATIONS FOR PLASTIC MAINS AND SERVICES

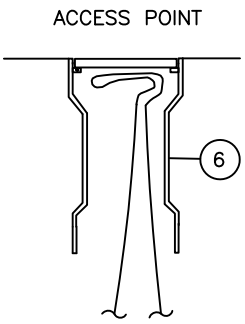
REVISIONS: UPDATED ITEM ID'S
REVISED NOTES

DATE: 10/31/2004	EFFECTIVE DATE: 06/25/2020
DESIGN: GUGLIOTTA / MCLOUGHLIN	STD. DWG. NO. CNST-6061
DRAWN: GUGLIOTTA / DIMAIO	

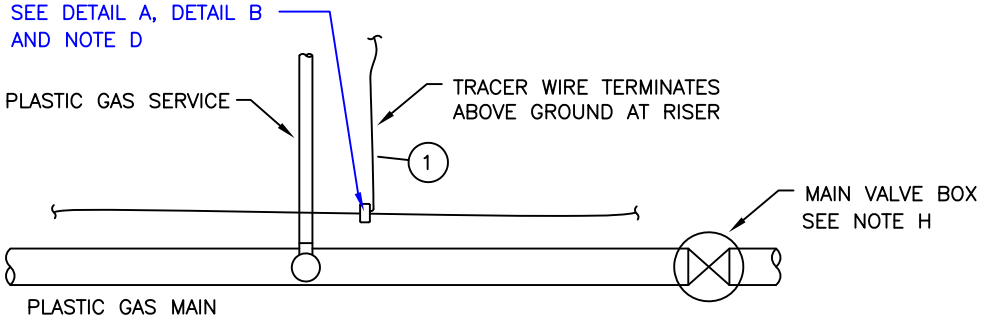








DETAIL C
ROADWAY BOX
SEE NOTE H



TOP VIEW

		LI/NYC/ MASS	UNY/RI
8	TRACER WIRE SNAP, 2" (represents steel size)	9386134	9386134
8	TRACER WIRE SNAP, 1 ½" (represents steel size)	9386156	9386156
8	TRACER WIRE SNAP, 1" (represents steel size)	9386150	9386150
8	TRACER WIRE SNAP, ¾" (represents steel size)	9385568	9385568
7	CLAMP, STAINLESS	9331708	9307873
6	VALVE BOX, ROADWAY	9339890	9312344 UNY 9311208 RI
5	ANODE, 3 LB MAGNESIUM	9315645	9315645
4	WIRE SPLICE CONNECTOR, WATERPROOF	9308036	9308036
3	WIRE NUT, PLASTIC, WATERPROOF	9331644	9314631
2	WIRE, DIRECTIONAL DRILL, STAINLESS, STRANDED 10 AWG	9314187	9314187
1	TRACER WIRE, DIRECT BURY, COPPER, 12 AWG	9315005	9315005
NO.	**ITEM**	**SAP ITEM ID**	
BILL OF MATERIAL			

A. Inside sets: Terminate tracer wire in the curb valve box. Allow enough wire to extend 18" to 24" above grade.

B. Outside Sets: Tracer wire should be extended approximately 18" above grade at riser. Connect tracer wire to the riser using a "tracer snap", Item #8. If the appropriate tracer snap is not available, wrap or tie the tracer wire to the riser. Do not permanently attach tracer wire to the riser. Tracer wire should not exceed 6" above the point where it is secured to the riser.

C. Partially tubed services: When the abandoned portion of an existing steel service pipe is used as a sleeve for the new plastic, all cut out sections of the steel pipe to be inserted with plastic, shall be connected using a section of tracer wire to maintain continuity. If the existing service is coated steel , see Installation of Test Stations for Cathodic Protection [030026-CS] and Installation of Test Stations for Cathodic Protection [COR04003] or contact corrosion department for more guidance.

D. Thermite welding of tracer wire to abandoned steel service is only acceptable prior to insertion of the plastic tubing. See Installation of Test Stations for Cathodic Protection [030026-CS].

E. Plastic Mains: The service tracer wire shall be connected to the plastic main tracer wire using item #3 detail A or item #4 (detail B - preferred) in accordance with Installing Wire Connections [COR04004].

F. Coated Steel Mains: Do not connect the tracer wire to the steel main. See Installation of Test Stations for Cathodic Protection [030026-CS] and Installation of Test Stations for Cathodic Protection [COR04003] or contact corrosion department for more guidance.

G. Cast Iron or Bare steel Mains: Do not connect the tracer wire to the main. It is required in LI and MA, and suggested in all other areas to terminate the tracing wire with a 3# anode.

Tracer Wire Installation Notes

H. Install tracer wire in close proximity to the plastic pipe. Approximately 4" to 6" away from the pipe. LI & MA- Above or alongside, UNY- alongside, RI-Under or alongside. Exception: For trenchless pipe installations, the minimum clearance is waived.

I. Maintain separation of approximately 4" from service riser. Do not permanently connect the tracer wire to the riser.

J. For horizontal directional drill installations, use stainless wire, item #2.

K. Tracer wire installed in boxes should allow enough wire to extend 18” to 24” above grade.

L. Verification: upon completion, the installer shall verify the location of the main or service using the tracer wire and locating device and perform a mark out using the conductive method.

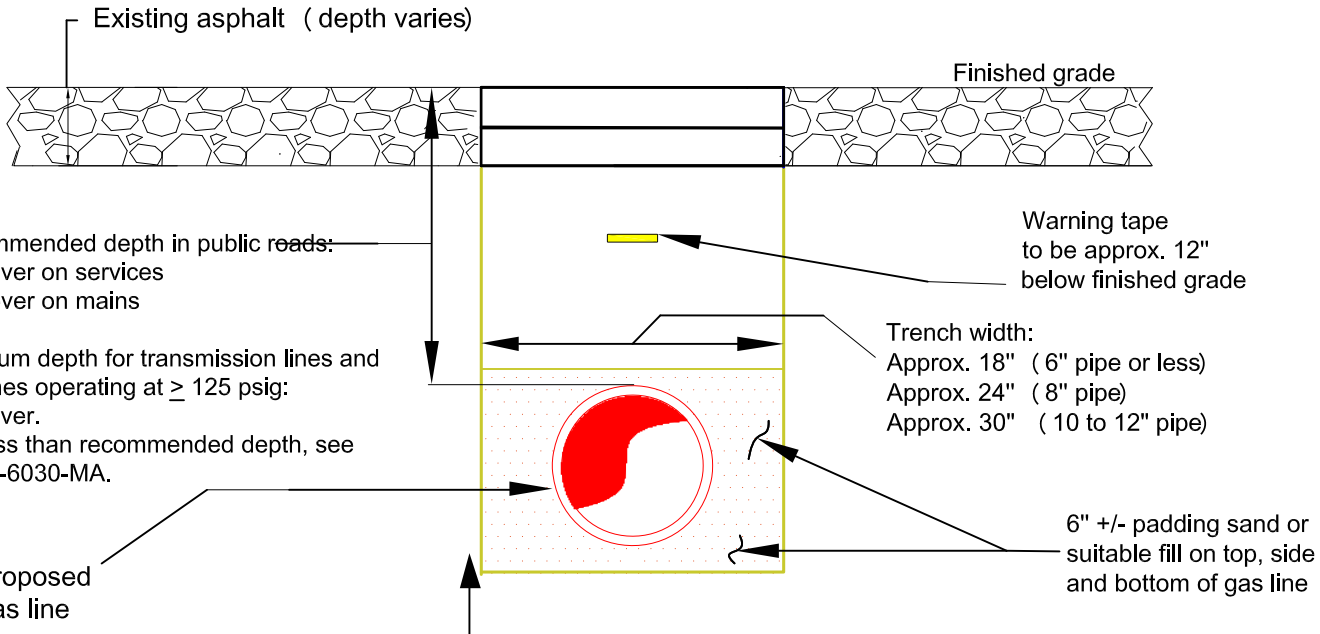
M. LI and MA: Required to terminate the tracing wire with a 3# anode. This is to ground the tracer wire and increase signal strength when locating. This practice is recommended in all areas where signal strength is an issue.

Regional Notes

NYC ONLY: refer to Installation of Marker Tapes and EMS Pipeline Locators for Mains and Services [CNST6060-NYC] for installation of electronic marker ball in place of tracer wire.

Typical Utility Crossing and Trench Guidelines

See CNST01003 for Backfill & Restoration Standards



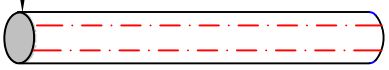
Other utility:

12" minimum perpendicular clearance (whenever practicable) above or below proposed gas line.
Protect the gas line if:

1. 12" min. cannot be attained for gas transmission lines and pipelines operating at ≥ 125 psig.
2. 6" min. cannot be attained for distribution mains.
3. 4" min. cannot be attained for services.

Minimum clearance when protection is provided against damage is 2" for all gas lines.

Cross Section Detail



For Backfill and Restoration details, refer to CNST01003 - Backfill and Restoration

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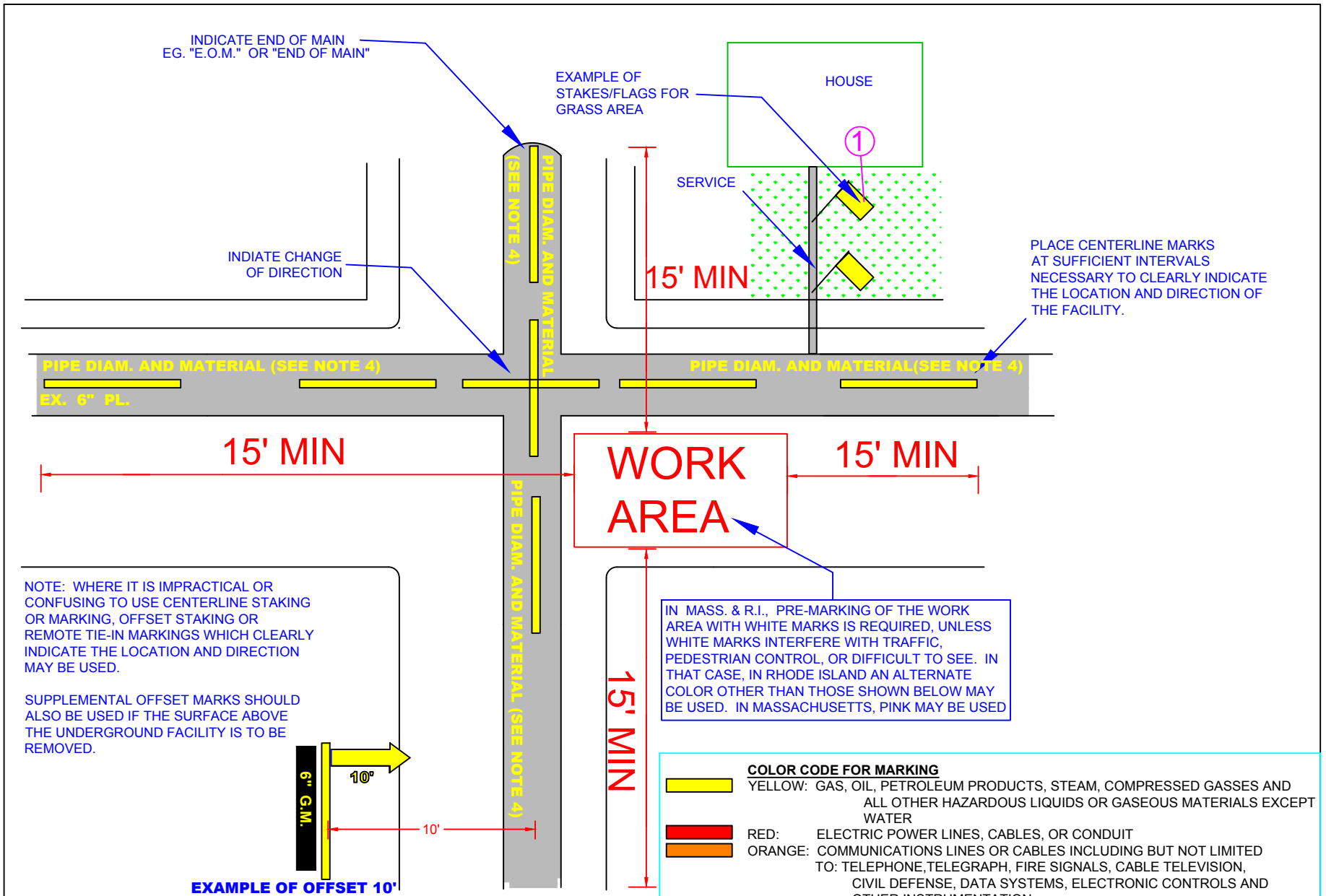
MASS.

TYPICAL UTILITY CROSSING AND TRENCH GUIDELINES

Key Changes: REV 0
NEW STANDARD FOR MASS.

DATE: 09/15/2014	EFFECTIVE DATE: 04/15/2019
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. CS-CNST002-MA
DRAWN: N. COSTANZO	



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ALL REGIONS

MARKOUT OF GAS FACILITIES

Key Changes:	DATE: 03/15/2015	EFFECTIVE DATE: 03/26/2020
FOR MASS ONLY: IN CASES OF CONFLICT ADDED PINK AS ALT. TO COLOR WHITE	DESIGN:	STD. DWG. NO. CS-DAM01016
	DRAWN:	

NOTES

1. A GAS FACILITY THAT IS IN OR WITHIN 15 FEET OF A WORK AREA SHALL BE LOCATED ACCURATELY AND WITH DUE CARE BE MEANS OF STAKING, MARKING OR OTHER DESIGNATION IN ACCORDANCE WITH THIS DRAWING. MARKING SHALL EXTEND AT LEAST 15 FEET BEYOND THE BOUNDARIES OF A PRE-MARKED AREA / WORK ZONE.

   NOTE: IN MASSACHUSETTS, THE UNDERGROUND FACILITY SHALL BE COMPLETELY LOCATED WITHIN A SAFETY ZONE OF NO MORE THAN 18 INCHES PLUS THE WIDTH OF THE FACILITY FROM THE DESIGNATED CENTERLINE. IN CENTERLINE MARKING, ONLY THE CENTER OF THE FACILITY IS MARKED. A "SAFETY ZONE" IS IMPLIED AND THEREFORE IS NOT SHOWN, REGARDLESS OF WHETHER PAINT, FLAGS, OR STAKING IS USED TO DENOTE THE FACILITIES**.**

2. **IN MASSACHUSETTS ONLY:** IN A PAVED AREA DESIGNATED AS A HISTORICAL LOCATION, CHALK, STAKES, FLAGS, BRUSH-TYPE MARKERS OR OTHER SUITABLE DEVICES WITH THE APPROPRIATE COLOR-CODING AFFIXED OR ATTACHED MAY BE USED INSTEAD OF FLUID MARKING.

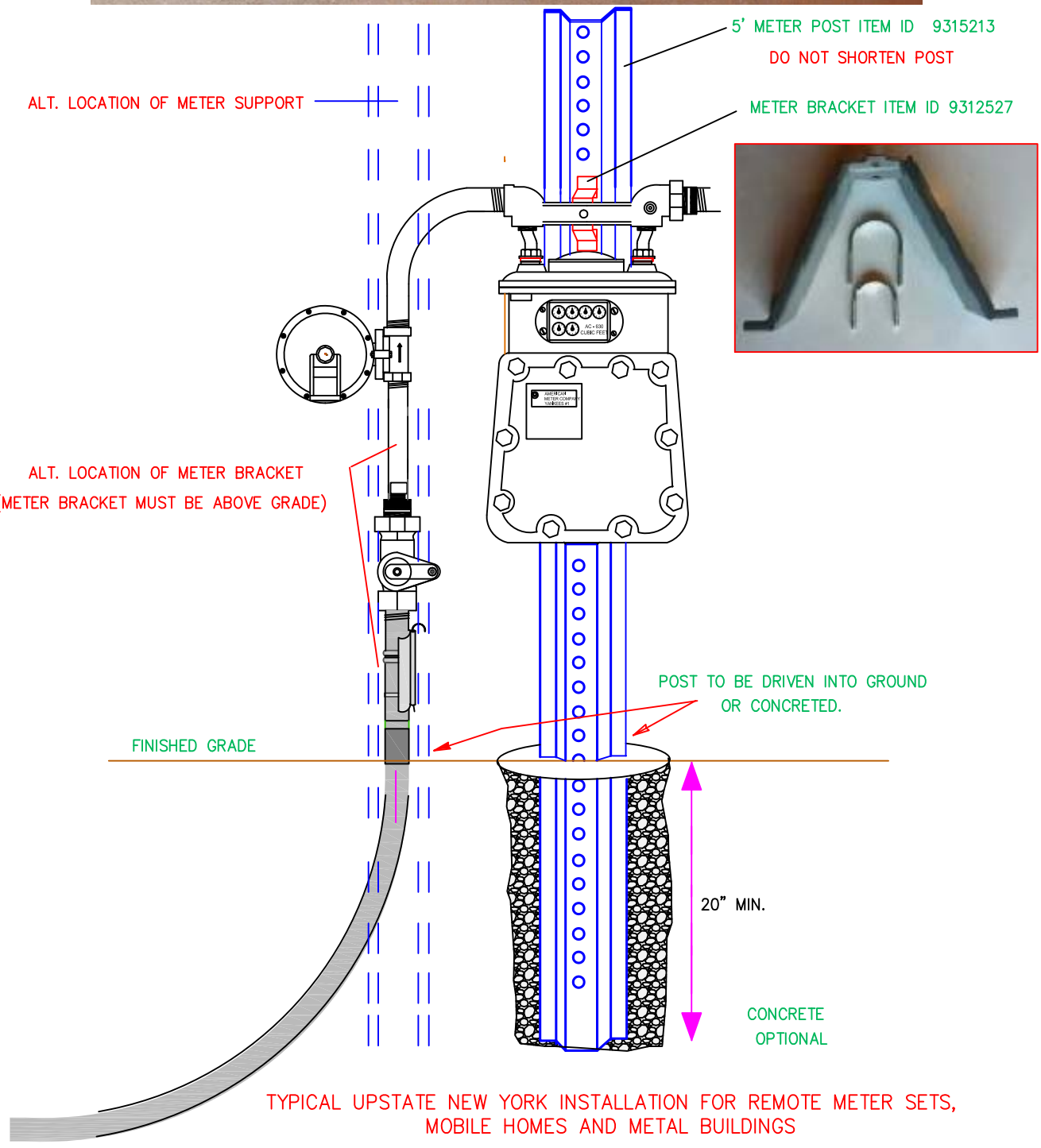
3. **IN MASSACHUSETTS ONLY:** THE SIZE OR DIAMETER OF THE FACILITY IS ONLY REQUIRED TO BE MARKED IF IT IS GREATER THAN 2 INCHES.

4. **IN NEW YORK STATE ONLY:** WHERE KNOWN, STAKES AND SURFACE MARKINGS SHALL INDICATE THE DEPTH OF THE FACILITY IN INCHES. FACILITY DEPTH IS CONSIDERED KNOWN WHEN THE FACILITY HAS BEEN VISUALLY VERIFIED AND FOUND TO BE CONSISTENT ALONG THE ENTIRE MARKED OUT FACILITY.

5. **IN NEW YORK STATE ONLY**: STAKES AND SURFACE MARKINGS SHALL INDICATE IN INCHES THE ~~E~~ SIZE OR DIAMETER OF THE UNDERGROUND FACILITY OR ITS INCASEMENT, IF KNOWN.

6. **IN NEW YORK STATE ONLY:** WHEN AN INCORRECT MARK IS DISCOVERED IN THE FIELD, PAINT AN "X" IN YELLOW OVER THE INCORRECT MARK AND THEN (IN STREET ONLY) THE MARK SHOULD BE BLACKENED OUT. IF THE MARK IS IN THE SIDEWALK, ONLY THE "X" IN YELLOW SHOULD BE DONE (NOT PAINTED OVER IN BLACK).
   - THE RESPONSIBLE PARTY WHO ORIGINALLY PLACED THE INCORRECT MARKS IN THE FIELD (EITHER NATIONAL GRID EMPLOYEE OR LOCATING COMPANY STAFF) SHOULD BE THE ONE WHO GOES BACK TO THE SITE TO PERFORM THIS.

ITEM	DESCRIPTION	SAP ITEM I.D NYC / LI / MASS	SAP ITEM I.D UNY	SAP ITEM I.D RI
1	FLAG – CAUTION - GAS	9310364	9310364	9310364
2	PAINT – MARKING WHITE	9332474	9314356	9314356
3	PAINT – MARKING YELLOW	9340907	9315375	9310251
4	PAINT – MARKING BLACK	9381794		9310315



TYPICAL UPSTATE NEW YORK INSTALLATION FOR REMOTE METER SETS, MOBILE HOMES AND METAL BUILDINGS

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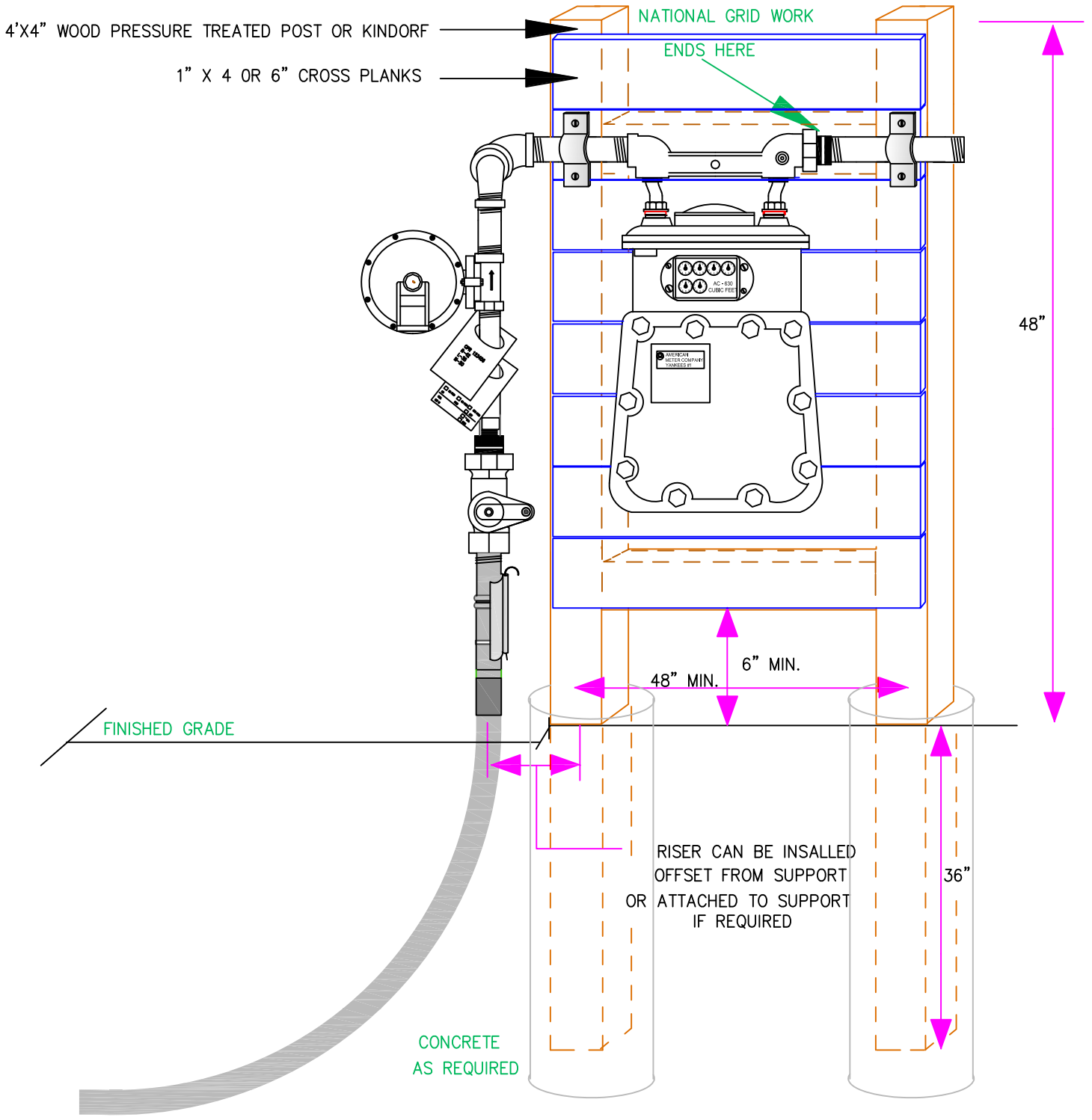
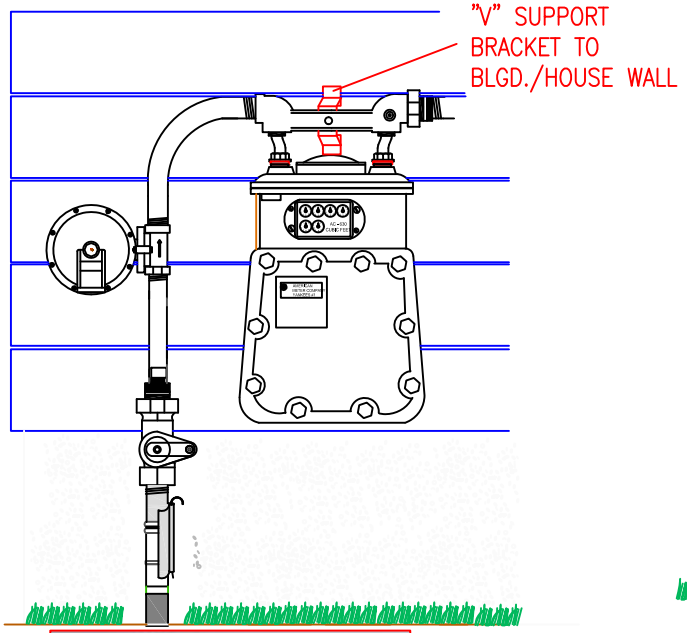
ALL REGIONS

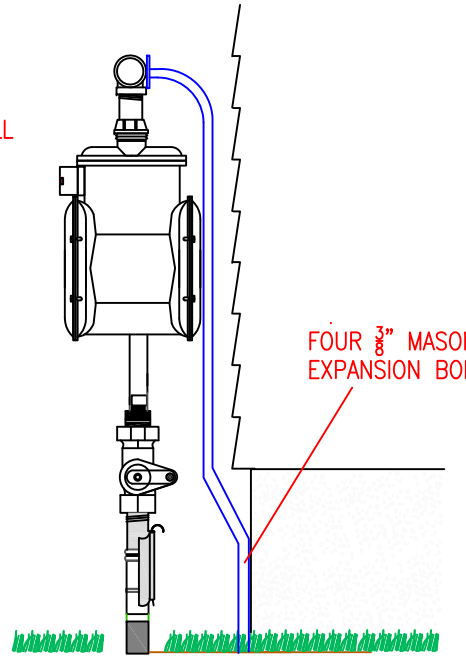
RESIDENTIAL OUTSIDE METER SUPPORTS FOR CLASS 250-1000 METERS

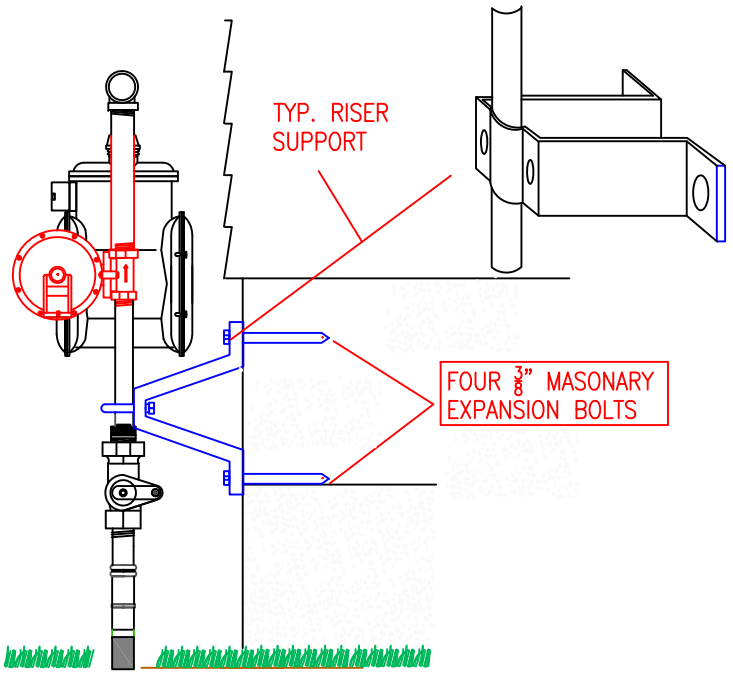
Key Changes:	DATE: 09/15/2015	EFFECTIVE DATE: 06/15/2016
	DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. **CS-MET016**
	DRAWN: PAUL GUGLIOTTA	



ALTERNATE DESIGN FOR REMOTE METER SETS







9315271 12" ADJUSTABLE UNY

9312528 UNY

9312525 2" RISER UNY
9336833 2" & 3" RISER MASS ONLY

9340885 3/4" & 2" RISER
LI/MASS/NYC

9340886 2" & 3" RISER LI/NYC
4" OFFSET

9323008 MASS ONLY

9312526 ALUM 4" WIDE UNY ONLY

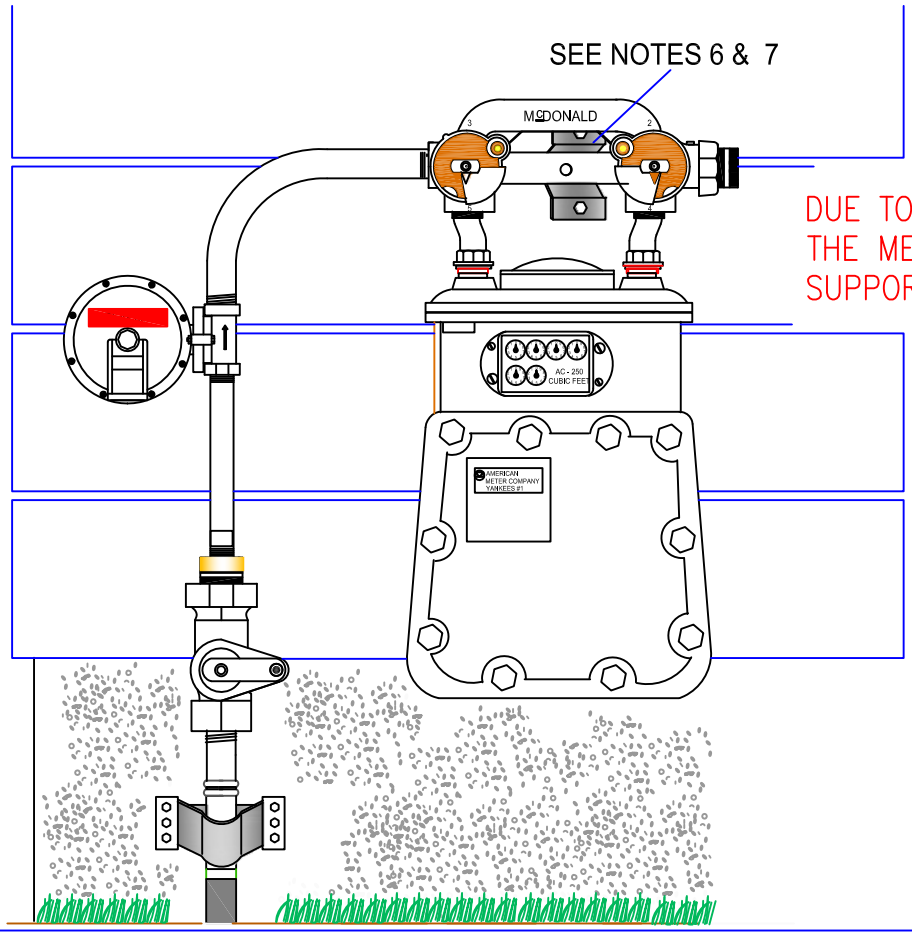
9312527 UNY

9384078 MASS ONLY

9310291 RI ONLY

TYPICAL METER BAR SUPPORTS

TYPICAL RISER SUPPORTS



DUE TO WEIGHT OF METER BAR THE METER SET MUST BE SUPPORTED.

ADDITIONAL BRACKETS AVAILABLE

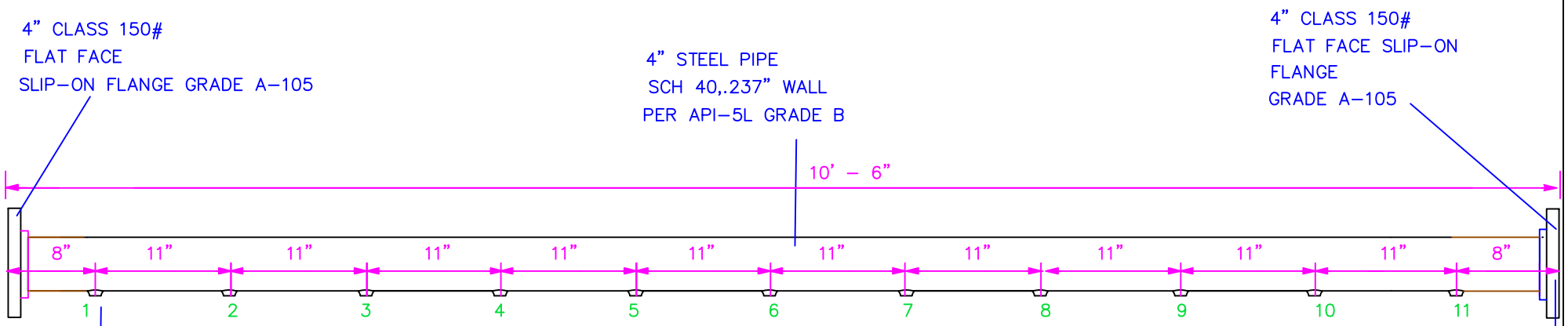
9311169 24"x12"x2"x2"
MASS/RI

9322430 MASS ONLY

9384105 10"x12"x1.5"x $\frac{1}{8}$" MASS ONLY
9384106 18"x18"x2"x 3/16" MASS ONLY

NOTES:

1. THIS STANDARD SHOWS TYPICAL METER AND RISER SUPPORTS, AS WELL AS, REMOTE METER INSTALLATION. ALTERNATE METHODS CAN BE USED IF APPROVED BY ENGINEERING.
2. REMOTE METER LOCATIONS SHALL ONLY BE USED WHEN NO FEASIBLE LOCATION AT THE HOUSE IS POSSIBLE AND MUST BE APPROVED BY NATIONAL GRID.
3. PROTECTION POSTS MAY BE REQUIRED PER MTRS-6060.
4. IT IS THE CUSTOMER'S RESPONSIBILITY TO SUPPLY AND INSTALL THE H-FRAME (SHOWN ON PAGE 2) PRIOR TO THE INSTALLATION OF THE GAS SERVICE.
5. ALL FLEX RISER MUST BE SUPPORTED
6. SINGLE RESIDENTIAL BY-PASS METER BARS SHALL BE INSTALLED WITH APPROPRATE SUPPORT BRACKET (ITEM ID 9322430)
7. WHEN ATTACHING SUPPORTS TO SIDING OR SHINGLES, PRE-DRILL THE HOLES IN THE SIDING OR SHINGLES.



1" THRED-O-LET
3000# GRADE A105
1" DIAM. TAP HOLE REQUIRED
11 PLACES

APPROX WEIGHT = 141 POUNDS

INSTALL FLANGE PROTECTORS
BOTH SIDES

NOTES

1. ALL WELDING SHALL CONFORM TO API-1104 PROCEDURES.
2. MAGNETIC PARTICLE TESTING SHALL BE PERFORMED ON ANY 2 WELDS. NDE REPORT SHALL BE PROVIDED WITH EACH SHIPMENT
3. ALL PIPING SHALL BE TESTED AT 90 PSIG FOR 5 MINUTES.
4. ALL PIPING SHALL BE SURFACE PREP, PRIMES AND PAINTED WITH ONE COAT OF SOLVENT BASED GRAY PRIMER MINIMUM OF 2-3 MILS, FOLLOWED BY ONE COAT OF SOLVENT BASED ASA#49 GRAY ACRYLIC ENAMEL 2-3 MILS MINIMUM. DO NOT PAINT THREADS INSIDE THREDOLET. INSTALL (11) 1 INCH PLASTIC THREAD PROTECTION PLUGS IN THREDOLETS.

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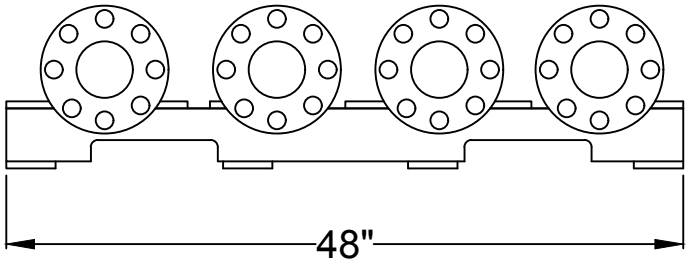
MASS. ONLY

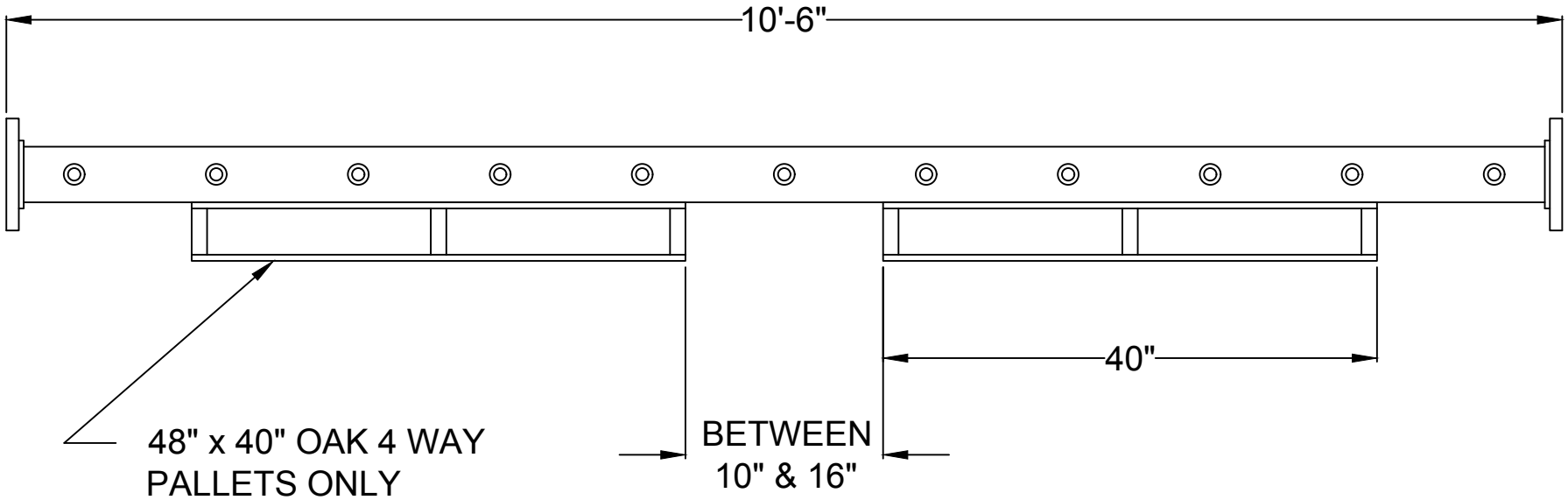
4" MULTIMETER HEADER

REVISIONS: revised dimensions to 11" spacing

DATE: 11/6/2017	EFFECTIVE DATE: 07/04/2019
DESIGN: B. FOSTER/P. GUGLIOTTA	STD. DWG. NO. **CS-MET017**
DRAWN: B. FOSTER/P. GUGLIOTTA	

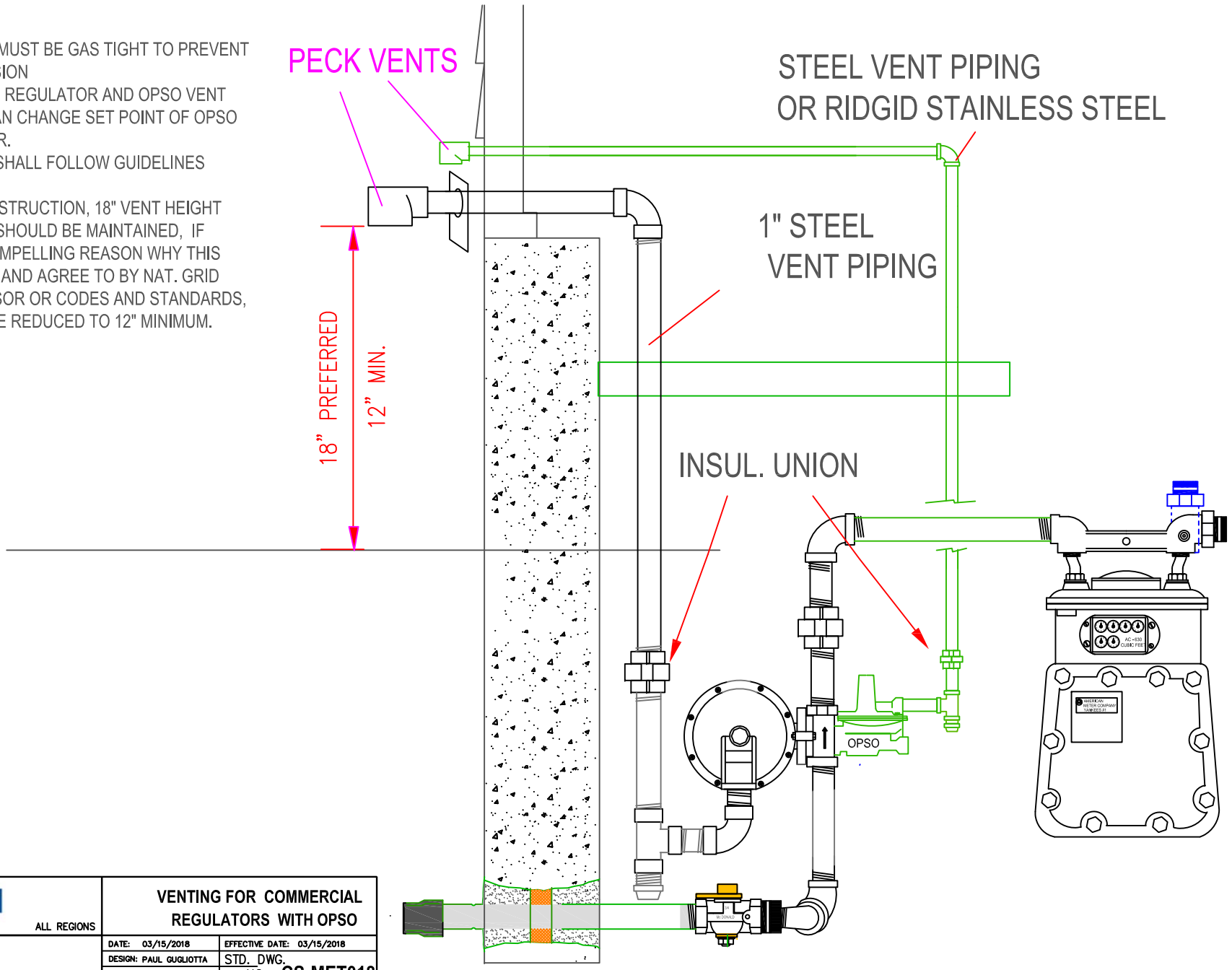


Each unit will contain (4) welded headers strapped to (2) pallets. Each header will have at least (1) strap to each of the pallets. The weld-o-lets should be rotated to the side to allow for the pallets to be stacked. The two pallets will be centered on the header and between 10" and 16" apart.



NOTES:

1. ALL VENT PIPING MUST BE GAS TIGHT TO PREVENT WATER INTRUSION
2. DO NOT COMBINE REGULATOR AND OPSO VENT LINES. THIS CAN CHANGE SET POINT OF OPSO OR REGULATOR.
3. VENT TERMINUS SHALL FOLLOW GUIDELINES IN CS-020013.
4. ON ALL NEW CONSTRUCTION, 18" VENT HEIGHT FROM GRADE SHOULD BE MAINTAINED, IF THERE IS A COMPELLING REASON WHY THIS CAN'T BE MET, AND AGREE TO BY NAT. GRID CMS SUPERVISOR OR CODES AND STANDARDS, THEN IS CAN BE REDUCED TO 12" MINIMUM.



nationalgrid ALL REGIONS	VENTING FOR COMMERCIAL REGULATORS WITH OPSO	
REVISIONS:	DATE: 03/15/2018	EFFECTIVE DATE: 03/15/2018
	DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. CS-MET018
	DRAWN: PAUL GUGLIOTTA	

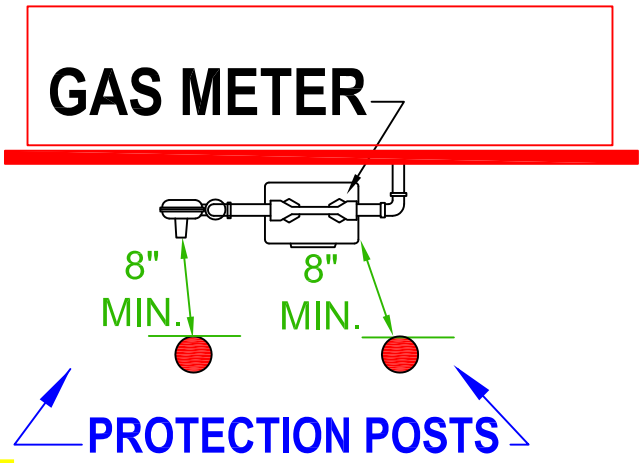
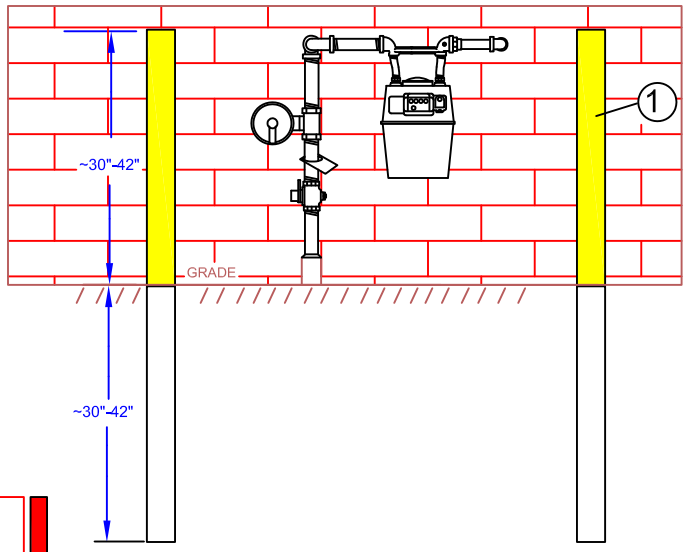


FIGURE 1

HEAD ON PARKING



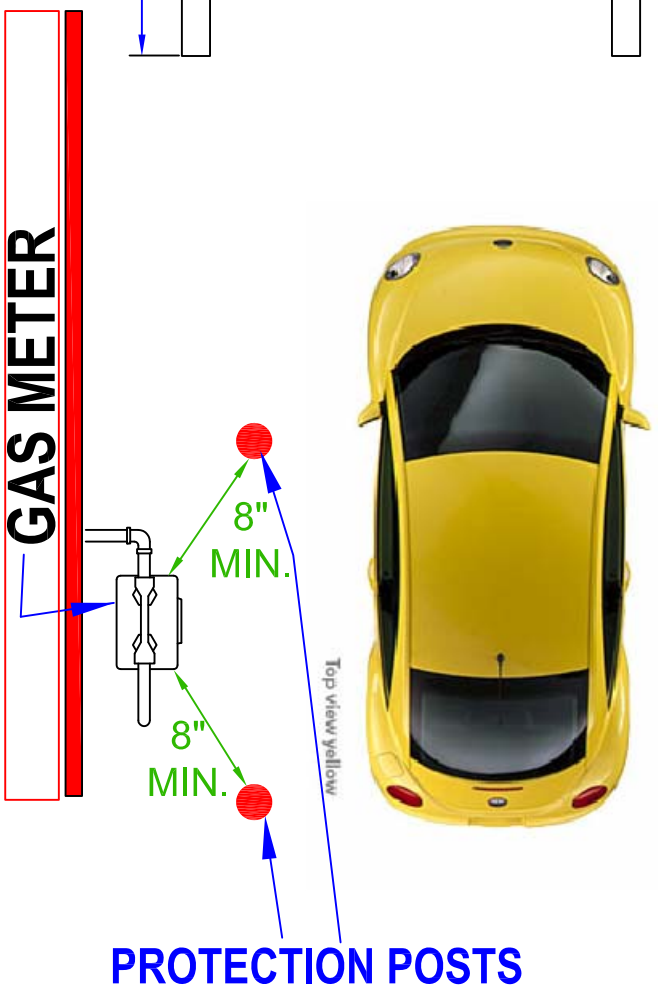


FIGURE 2

DRIVEWAY OR ADJACENT PARKING

nationalgrid ALL REGIONS

INSTALLATION OF PROTECTION POST OUTSIDE METER SETS

REVISIONS: MADE APPLICABLE TO ALL REGIONS

DATE: 07/01/2003	EFFECTIVE DATE: 09/15/2013
DESIGN: PG	STD. DWG. NO. **MTRS-6060**
DRAWN: PG	

NOTES:

A. WHERE PRACTICAL, CUSTOMER METERS AND SERVICE REGULATORS SHOULD BE INSTALLED IN AN AREA AWAY FROM VEHICULAR TRAFFIC AND OTHER POTENTIAL HAZARDS.

B. WHENEVER THE METER AND/OR SERVICE REGULATOR ASSEMBLY IS POTENTIALLY SUBJECT TO DAMAGE FROM VEHICULAR TRAFFIC, AND NO OTHER MEANS OF PROTECTION EXISTS (E.G., CURB STOP, RETAINING WALL, ELEVATED PLATFORM, ETC.) PROTECTION POST(S) SHALL BE INSTALLED.

C. EXAMPLES OF METER/SERVICE RISER LOCATIONS REQUIRING PROTECTION SHALL INCLUDE BUT NOT BE LIMITED TO:

1) WHERE THE METER/SERVICE RISER IS LOCATED AT THE END OF A DRIVEWAY (SEE FIG. (1.))
2) WHERE THE METER/SERVICE RISER IS LOCATED ADJACENT A DRIVEWAY (SEE FIG. (2.))
3) WHERE THE METER/SERVICE RISER IS LOCATED IN A PARKING LOT
4) WHERE THE METER/SERVICE RISER IS LOCATED IN A LOADING AREA

D. RESPONSIBILITY FOR METER PROTECTION SHALL BE DETERMINED ON A CASE BY CASE BASIS.

E. PROTECTION POSTS SHOULD MAINTAIN A MINIMUM CLEARANCE OF EIGHT (8) INCHES AROUND THE METER AND REGULATOR

F. FOR CERTAIN COMMERCIAL AND INDUSTRIAL APPLICATIONS ADDITIONAL PROTECTION MAY BE REQUIRED IN EXCESS OF THIS POLICY DOCUMENT.

G. THE INSTALLATION OF PROTECTION POSTS SHOULD BE DOCUMENTED ON THE GAS SERVICE RECORD CARD.

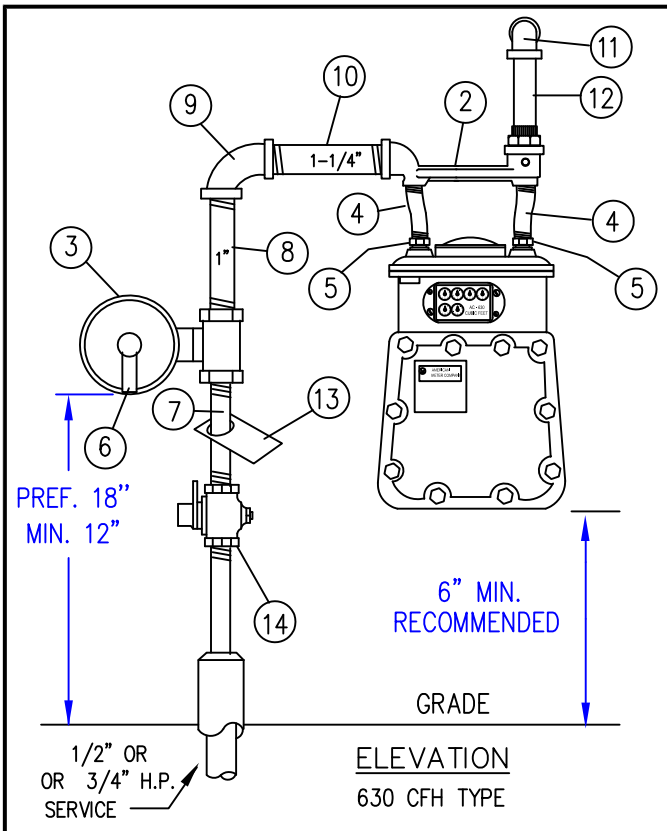
H. THE POSTS FOR RESIDENTAL OR SMALL COMMERCIAL SETS SHOULD BE 3-1/2 OR 4 INCHES OD STEEL, PAINTED OR GALVANIZED, AND 5-7 FEET IN LENGTH. WHERE FEASIBLE, FILL POSTS WITH CONCRETE.
NOTE: 2" GALV. STEEL IS CURRENTLY USED IN UNY AND ACCEPTABLE FOR RESIDENTAL AND SMALL COMMERCIAL INSTALLATIONS.

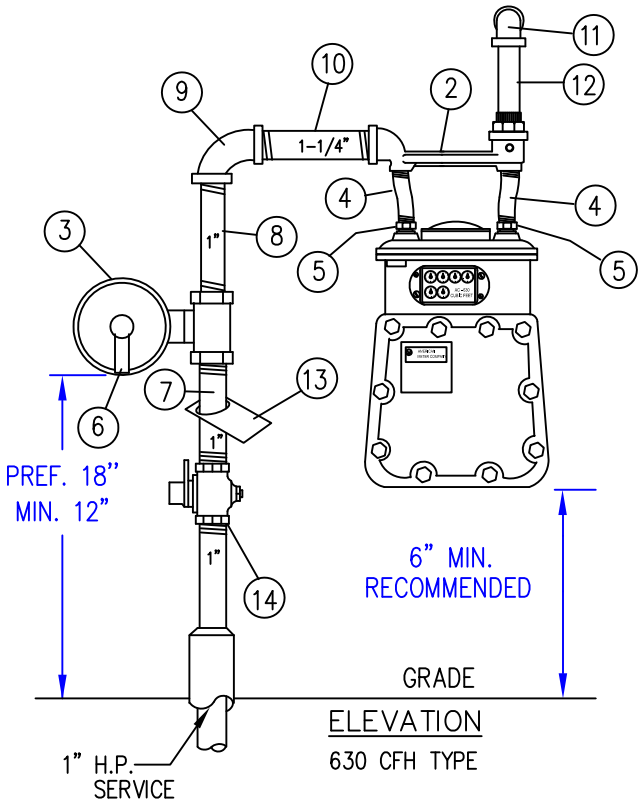
I. THE POST SHOULD BE SET 30-42 INCHES ABOVE AND 30-42 INCHES BELOW GRADE. ALTERNATES ARE PERMISSIBLE IF THE ABOVE MATERIAL IS NOT IN STOCK. OBTAIN APPROVAL FROM YOUR SECTION MANAGER OR CHECK WITH GAS ENGINEERING IF YOU ARE UNCERTAIN.

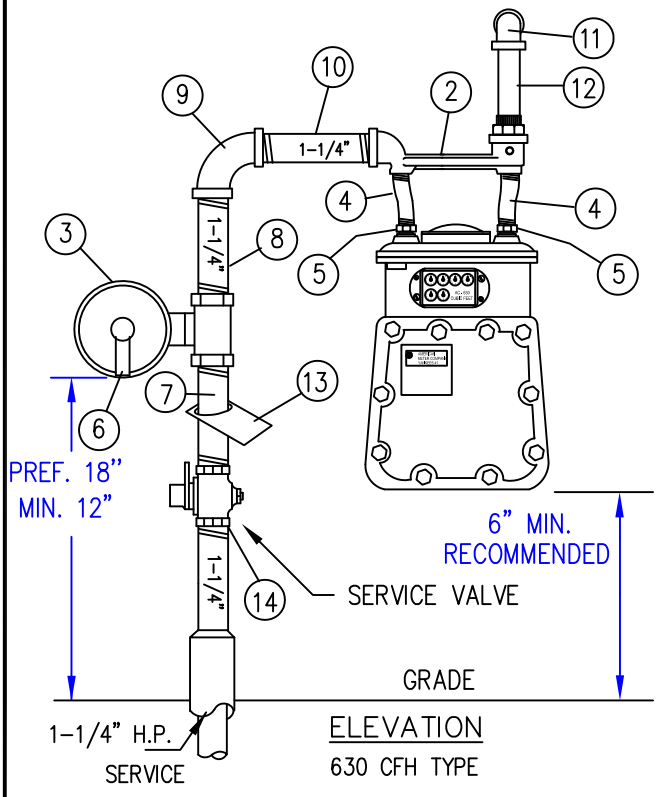
J. FOR CERTAIN COMMERCIAL AND INDUSTRIAL APPLICATIONS, ADDITIONAL PROTECTION MAY BE REQUIRED IN EXCESS OF THIS STANDARD

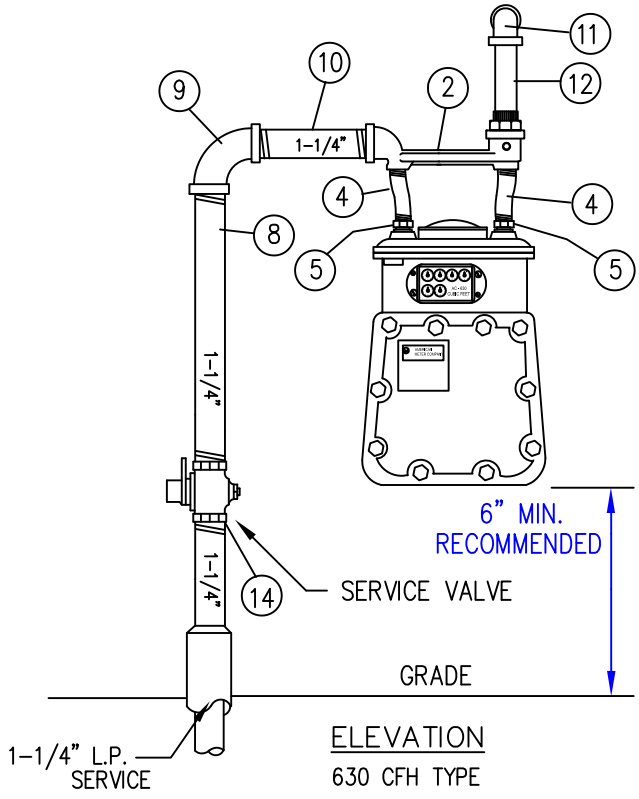
		SAP ITEM ID'S
2	CONCRETE – READY MIX 40 LB. BAG (SEE NOTE F)	9331384 LI, NYC
1	POST 3.5" O.D. 6' LONG – CONCRETE FILLED - PRIMED COATED OR POST 4.5" O.D. 5' LONG GALVANIZED 0.237" WALL – **NOT CONCRETE FILLED** POST 3.5" OD 7' LONG – CONCRETE FILLED POST 2" GALVANIZED .154" WALL + CAP FOR 2" POST POST 6" STEEL .280" WALL (FOR LARGE COMMERCIAL SETS IN UNY) + OUTER YELLOW PLASTIC SLEEVE	9340162 LI, NYC, MASS 9340113 LI, NYC, MASS 9310316 RI, MASS 9312317 UNY 9312317 UNY 9312325 UNY 9308350 UNY
NO.	**ITEM**	**CODE No.**

BILL OF MATERIAL









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MA

SINGLE METER AND REGULATOR INSTALLATION OUTSIDE SET, $\frac{1}{2}$" TO 1-$\frac{1}{4}$" DIAMETER SERVICES OPERATING AT LP - 100 PSIG USING AMERICAN AC-630 CFH METER

REVISIONS: REVISED USING SAP ITEM ID #'S

DATE: 12/01/2006	EFFECTIVE DATE: 09/15/2013
DESIGN: P. GUGLIOTTA	STD. DWG. NO. MTRS-6141
DRAWN: P. GUGLIOTTA	

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.

		½" OR ¾" SERVICE	1" SERVICE	SUPPLIED BY
14	METER VALVE, LOCK WING	9312258	9312270	NGG
13	ALUMINUM REGULATOR TAGS (SEE CUST-5175)	9346233	9346233	NGG
12	HOUSE PIPING TO LOAD	---	---	CUSTOMER
11	ELBOW 90 DEGREES M.I., SIZE OF HOUSE PIPE	1-1/4"	1-1/4"	CUSTOMER
10	NIPPLE, 3" MINIMUM (LENGTH AS REQUIRED)	1-1/4"	1-1/4"	CUSTOMER
9	ELBOW/REDUCING ELBOW 90 DEG M.I.	1"X 1-1/4"	1"X1-1/4"	CUSTOMER
8	NIPPLE 1" X 3" MINIMUM (LENGTH AS REQUIRED)	1"	1"	CUSTOMER
7	NIPPLE ¾" X 4" MINIMUM (LENGTH AS REQUIRED) NIPPLE 1" X 4" MINIMUM (LENGTH AS REQUIRED)	¾" ---	--- 1"	CUSTOMER
6	VENT ASSEMBLY WITH INSECT RESISTANT SCREEN IF REQ'D, 1"	9358640	9358640	NGG
5	METER CAP/NUT CONNECTION 45 LT	9322652	9322652	NGG
4	METER SWIVEL OFFSET 1-1/4" X 45 LT	9386167	9386167	NGG
3	REGULATOR, ¾" X 1" WITH 1/8" ORIFICE FOR 100 PSIG REGULATOR, ¾" X 1" WITH 3/16" ORIFICE FOR 60 PSIG REGULATOR, 1" X 1" WITH ¼" ORIFICE 22/25 PSIG SYSTEM REGULATOR, 1" X 1" WITH 3/16" ORIFICE 60 PSIG SYSTEM REGULATOR, 1" X 1" WITH 1/8" ORIFICE 100 PSIG SYSTEM	9383047 9323053 - - -	- - 9323063 9307967 9307968	NGG
2	METER BAR, W/INSUL. OUTLET, MUELLER 701127K 1-1/4" X 1-1/4" X 1-1/4" TOP OUTLET 7" SPREAD	9323009	9323009	NGG
1	METER (TEMPERATURE COMPENSATED) AMERICAN AC-630 CAPACITY 630 SCFH WITH ½" DIFFERENTIAL	AC-630	AC-630	
		½" OR ¾" SERVICE	1" SERVICE	
No.	**ITEM**			**NGG CODE No.**

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.

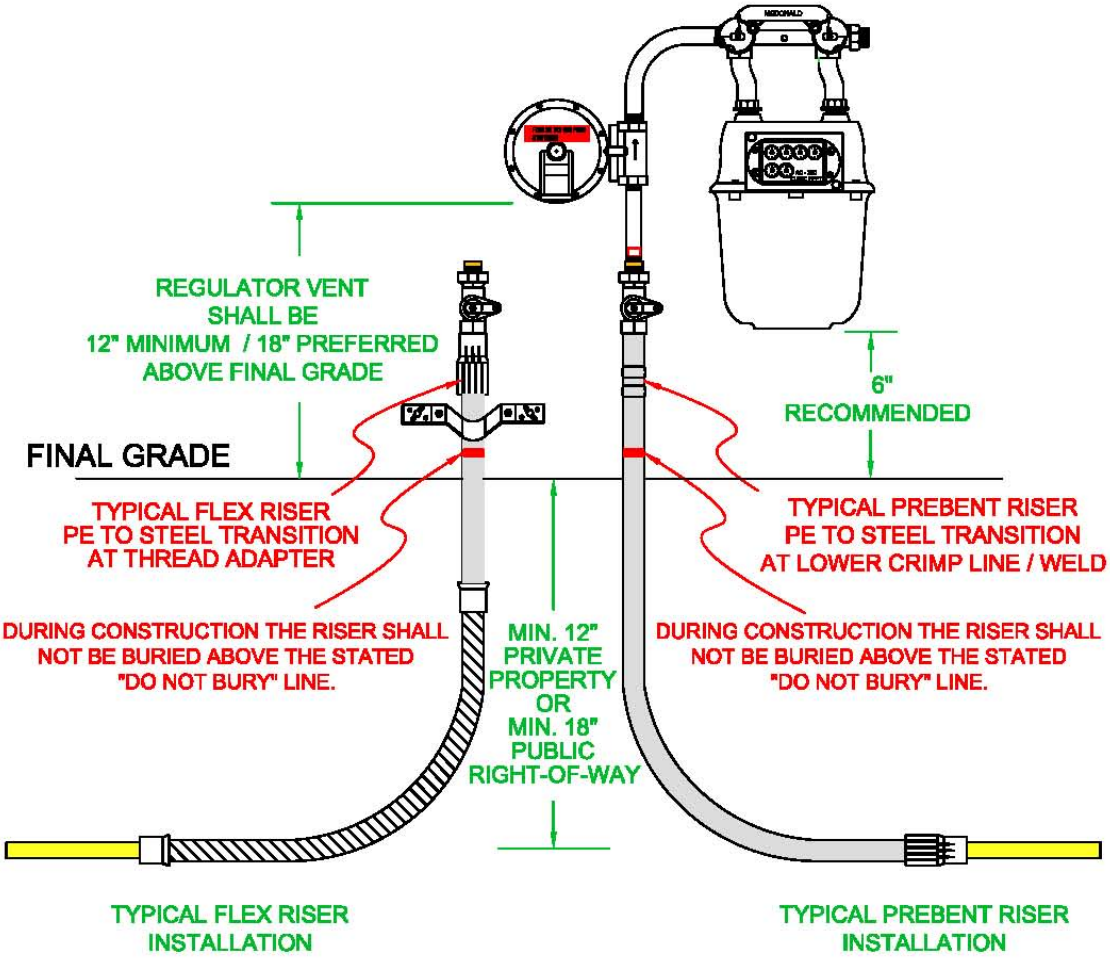
C. ALUMINUM TAGS ARE REQUIRED FOR SERVICE THAT HAVE A REGULATOR AND WILL DENOTE SYSTEM PRESSURE, OUTLET PRESSURE AND INDICATE IF AN EFV IS INSTALLED.

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. USE THE 1-¼" ITRON B34SR WITH 7/8" X 1" ORIFICE WHICH WILL GIVE 650 SCFH CAPACITY ON THE 2 PSIG SYSTEM.

		1-1/4" HP SERVICE	1-1/4" LP	SUPPLIED BY
14	METER VALVE, LOCK WING	9322526	9322526	NGG
13	ALUMINUM REGULATOR TAGS SEE CUST-5175	9346233	NOT REQUIRED	NGG
12	HOUSE PIPING TO LOAD	---	---	CUSTOMER
11	ELBOW 90 DEGREES M.I., SIZE OF HOUSE PIPE	1-1/4"	1-1/4"	CUSTOMER
10	NIPPLE, 3" MINIMUM (LENGTH AS REQUIRED)	1-1/4"	1-1/4"	CUSTOMER
9	ELBOW 90 DEG M.I.	1-1/4"	1-1/4"	CUSTOMER
8	NIPPLE 1-1/4" X (LENGTH AS REQUIRED)	1-1/4"	1-1/4"	CUSTOMER
7	NIPPLE 1-1/4" X 4" MINIMUM (LENGTH AS REQUIRED)	1-1/4"	---	CUSTOMER
6	VENT ASSEMBLY WITH INSECT RESISTANT SCREEN IF REQ'D, 1"	9358640	9358640	NGG
5	METER CAP/NUT CONNECTION 45 LT	9322652	9322652	NGG
4	METER SWIVEL OFFSET 1-1/4" X 45 LT	9386167	9386167	NGG
3	REGULATOR, 1-1/4" WITH 1/2" ORIFICE FOR 2 PSIG **SEE NOTE E** REGULATOR, 1-1/4" ITRON B34SR 7/8"X1" ORIF 2 PSIG MAX REGULATOR, 1-1/4" ITRON B31IMR 3/16" ORIF 60 PSIG MAX*	9323251 9378716 9381860	NOT REQUIRED	NGG
2	METER BAR, W/INSUL. OUTLET MUELLER 701127K, 1-1/4"x1-1/4"x1-1/4" TOP OUTLET, BLACK	9323009	9323009	NGG
1	METER (TEMPERATURE COMPENSATED) AMERICAN AC-630 630 SCFH WITH ½" DIFFERENTIAL	AC-630	AC-630	
		1-1/4" HP SERVICE	1-1/4" LP	
No.	**ITEM**			**NGG CODE No.**

BILL OF MATERIAL



PROPER INSTALLATION AND MAINTENANCE OF PREBENT OR FLEX RISERS SHALL BE SUCH THAT THE PE TO STEEL TRANSITION, METER VALVE & METER ARE ABOVE GRADE OR CATHODICALLY PROTECTED IN ACCORDANCE WITH COMPANY STANDARDS & POLICIES.

FOR LP INSTALLATIONS - VENTING RESTRICTIONS DO NOT APPLY.

THIS STANDARD REPRESENTS INSTALLATION CLEARANCES ASSOCIATED WITH THE RISER & METER SET. IT IS NOT MEANT TO DICTATE METER LOCATION, WHICH SHALL BE IN ACCORDANCE WITH COMPANY STANDARDS & POLICIES.

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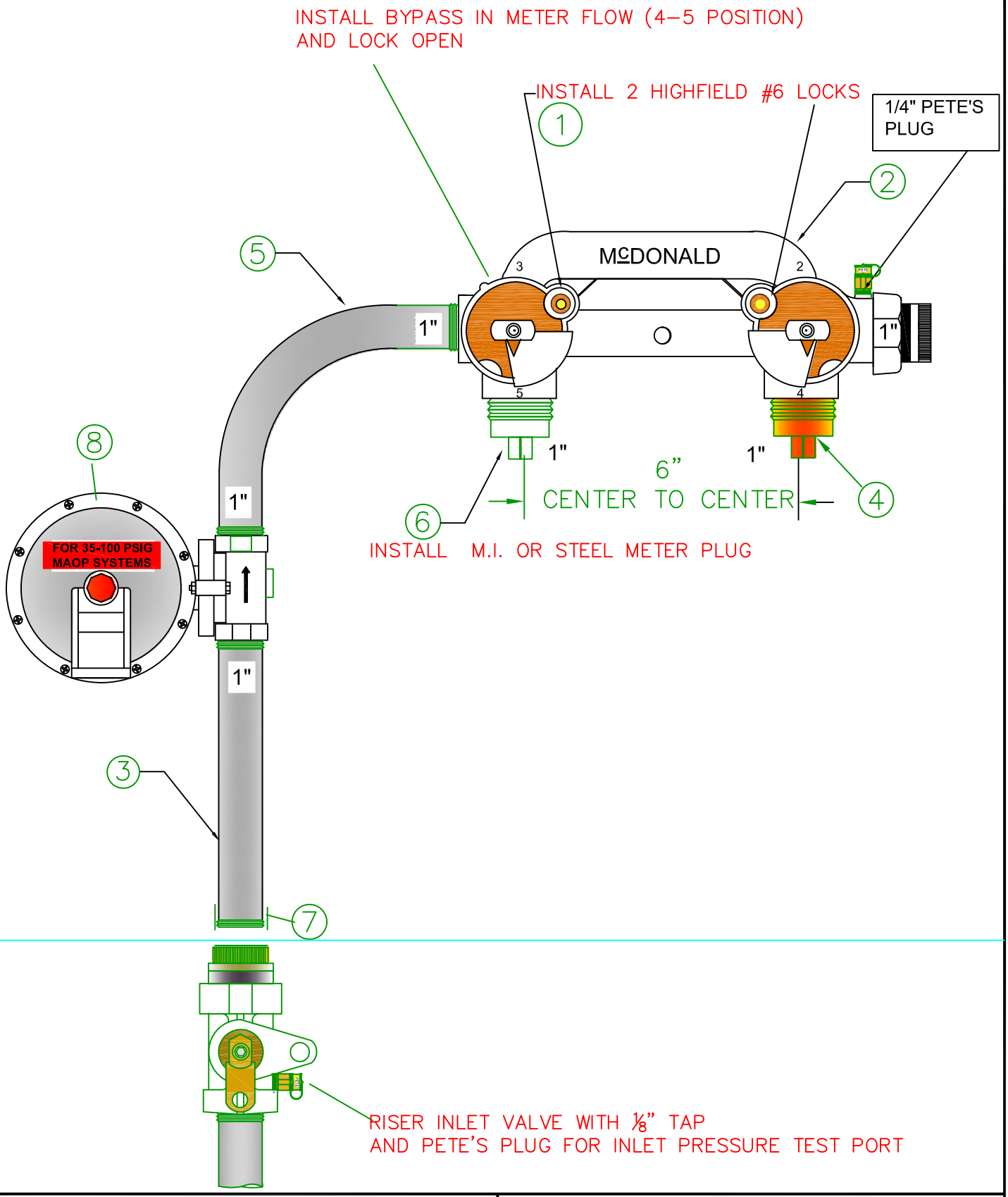
MA

CLEARANCES ON TYPICAL RESIDENTIAL HP OR LP SERVICE RISER INSTALLATIONS

REVISIONS: BURY LINE NOTE CHANGE

DATE: 01/07/2010	EFFECTIVE DATE: 03/22/2014
DESIGN: P.GUGLIOTTA – B.FOSTER	STD. DWG. NO. **MTRS-6143**
DRAWN: P.GUGLIOTTA – B.FOSTER	

SHT 1 OF 1



nationalgrid

MA

SIZE 250 AND 400 PREFABRICATED SINGLE METER SET WITH BYPASS FOR 35 - 100 PSIG INLETS

REVISIONS: REV 1: REMOVED INLET VALVE AND SWIVELS. METER BAR CHANGED TO 1" X 1" X 1"

DATE: 05/15/2018	EFFECTIVE DATE: 05/01/2018
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. **MTRS-6601**
DRAWN: PAUL GUGLIOTTA	

NOTES:

1. LEAK TEST METER SET TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED

2. 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. NOTE: DO NOT PAINT OVER MOVEABLE PARTS AND OVER METER BAR BARREL LOCK INSERTS.

REGULATOR SPECIFICATION:

REGULATOR MODEL	MAX. INLET PRESSURE	DESIGN INLET PRESSURE	DESIGN FLOW RATE	ORIFICE DIAMETER	SPRING RANGE	SET POINT
AMERICAN 1813B2	125 PSIG	10 PSIG MIN.	400 SCFH	**1/8" x 3/16"**	SEE NOTE #3	7" W.C.

DESIGN INLET PRESSURE IS THE INLET PRESSURE THAT THE REGULATOR MANUFACTURER SHALL USE TO SET THE SET POINT.

3. SPRING RANGE SHALL BE SUCH THAT THE 7" W.C. SET POINT EXIST BETWEEN 40% AND 60% OF ITS ESTABLISHED RANGE

4. FOR ITEM #4: USE A PLASTIC THREAD PROTECTOR.

5. INSTALL A LAMINATED LABEL ON EACH ASSEMBLY AS FOLLOWS FOR EACH ITEM ID SPECIFIED:

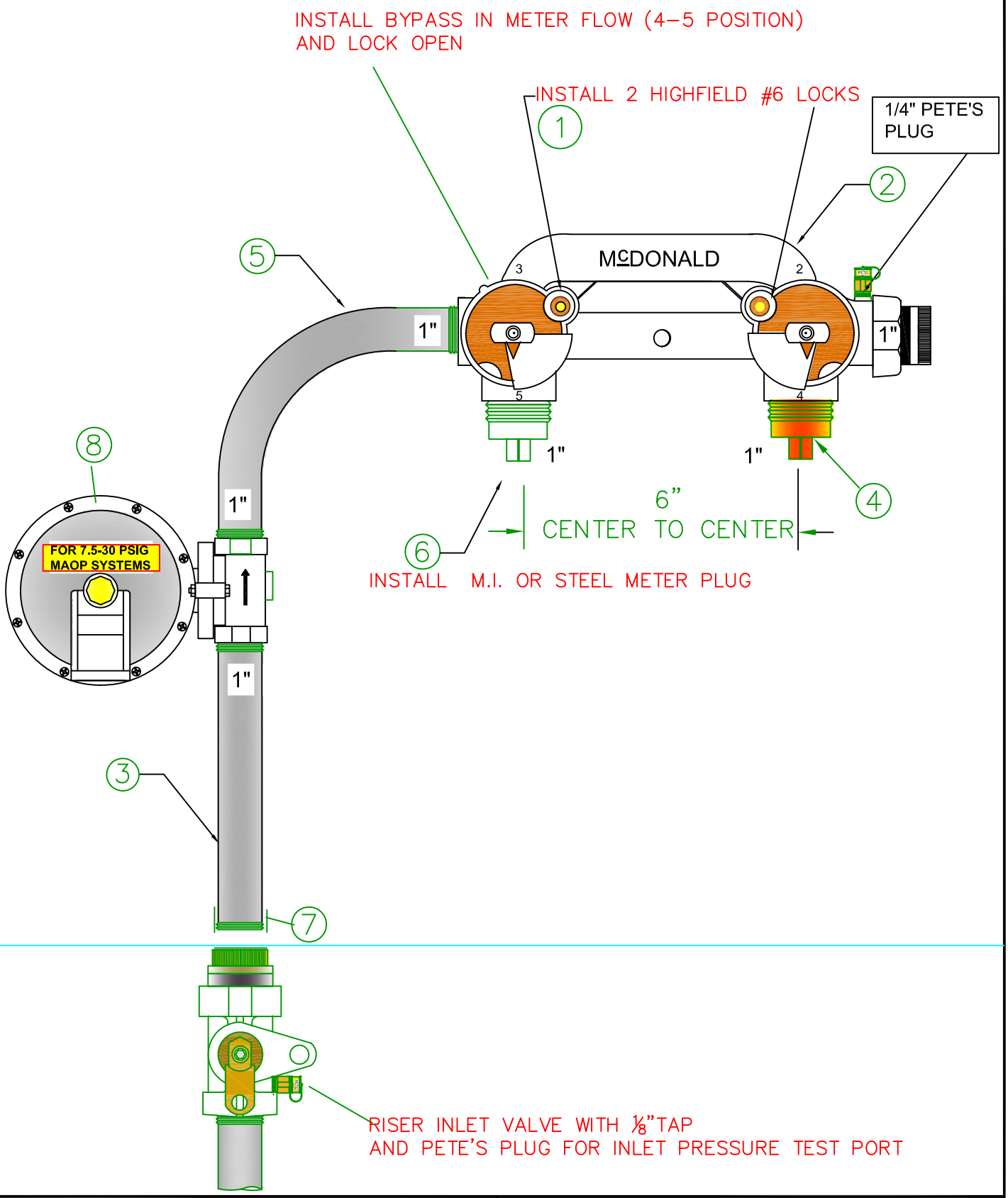
NATIONAL GRID ITEM ID: 9347519
SYSTEM: MAOP FOR 35 -100 PSIG MAOP SYSTEMS
SET PRESSURE: 7" W.C.

6. EACH PREFAB SET TO HAVE A 3" LONG X 1" HIGH RED STICKER AND BLACK LETTERING (.25" HIGH) PLACED ON THE REGULATOR TOP OF THE DIAPHRAGM) SAYING:

"FOR 35 -100 PSIG MAOP SYSTEMS"

ITEM	DESCRIPTION	SIZE	QTY
8	REGULATOR AMERICAN 1813B2 WITH 1/8" X 3/16" ORIFICE, 5.5 – 8.5" W.C., YELLOW SPRING SET @ 7" W.C. 1" VENT POSITION C VENT. RED SPRING CAP. ALUMINUM TAG INDICATING 100 PSIG MAX, ORIFICE SIZE, DATE OF MANUFACTURE, SPRING RANGE. IN ADDITION, EACH REGULATOR SHALL HAVE A RED STICKER SAYING "FOR 35-100 PSIG MAOP SYSTEMS." Or REGULATOR FISHER HSR WITH 1/8" ORIFICE, 6.0 – 8.0" W.C., YELLOW SPRING SET @ 7" W.C. 1" VENT POSITION 3 VENT. RED SPRING CAP. ALUMINUM TAG INDICATING 100 PSIG MAX, ORIFICE SIZE, DATE OF MANUFACTURE, SPRING RANGE. IN ADDITION, EACH REGULATOR SHALL HAVE A RED STICKER SAYING "FOR 35-100 PSIG MAOP SYSTEMS."	1" X 1"	1
7	PLASTIC PLUG PRORTECTOR	1"	1
6	PLUG, M.I. OR STEEL	1"	1
5	BEND, SCHEDULE 40, API-5L GRADE B, CARBON STEEL 6" RADIUS, MALE THREADS BOTH ENDS	1"	1
4	PLASTIC PROTECTOR CAPS – 1"	1"	1
3	NIPPLE, SCHEDULE 40, API-5L GRADE B, CARBON STEEL, 6" LONG. MALE THREADS BOTH ENDS	1"	1
2	METER BAR ASSEMBLY, AY MCDONALD **WITH BYPASS** MODEL 4824-203 6410-FFD 1X1X1 BLK HxH – TO BE IN POSITION 5 - 4 METER FLOW POSITION LOCKED OPEN. AND ¼" PETE'S PLUG	1" X 1" X 1"	1
1	LOCKS – BULLET – HIGHFIELD #6 PART # 93180125-WS	-	2
NO.	**ITEM**	**NGG CODE NO.**	

BILL OF MATERIAL



nationalgrid

MA

SIZE 250 AND 400 PREFABRICATED SINGLE METER SET WITH BYPASS FOR 7.5 - 30 PSIG INLETS

REVISIONS: REVISION 1: REMOVED INLET VALVE AND SWIVELS. CHANGED METER BAR TO 1" X1' X1"

DATE: 05/1/2018	EFFECTIVE DATE: 05/1/2018
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6604
DRAWN: PAUL GUGLIOTTA	

NOTES:

1. LEAK TEST METER SET TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED

2. 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. NOTE: DO NOT PAINT OVER MOVEABLE PARTS AND OVER METER BAR BARREL LOCK INSERTS.

REGULATOR SPECIFICATION:

REGULATOR MODEL	MAX. INLET PRESSURE	DESIGN INLET PRESSURE	DESIGN FLOW RATE	ORIFICE DIAMETER	SPRING RANGE	SET POINT
AMERICAN 1813B2	30 PSIG	3 PSIG MIN.	400 SCFH	**1/4"**	SEE NOTE #3	7" W.C.

DESIGN INLET PRESSURE IS THE INLET PRESSURE THAT THE REGULATOR MANUFACTURER SHALL USE TO SET THE SET POINT.

3. SPRING RANGE SHALL BE SUCH THAT THE 7" W.C. SET POINT EXIST BETWEEN 40% AND 60% OF ITS ESTABLISHED RANGE

4. FOR ITEM #4: USE A PLASTIC THREAD PROTECTOR.

5. INSTALL A LAMINATED LABEL ON EACH ASSEMBLY AS FOLLOWS FOR EACH ITEM ID SPECIFIED:

NATIONAL GRID ITEM ID: 9347535
SYSTEM: "FOR 7.5-30 PSIG MAOP SYSTEMS"
SET PRESSURE: 7" W.C.

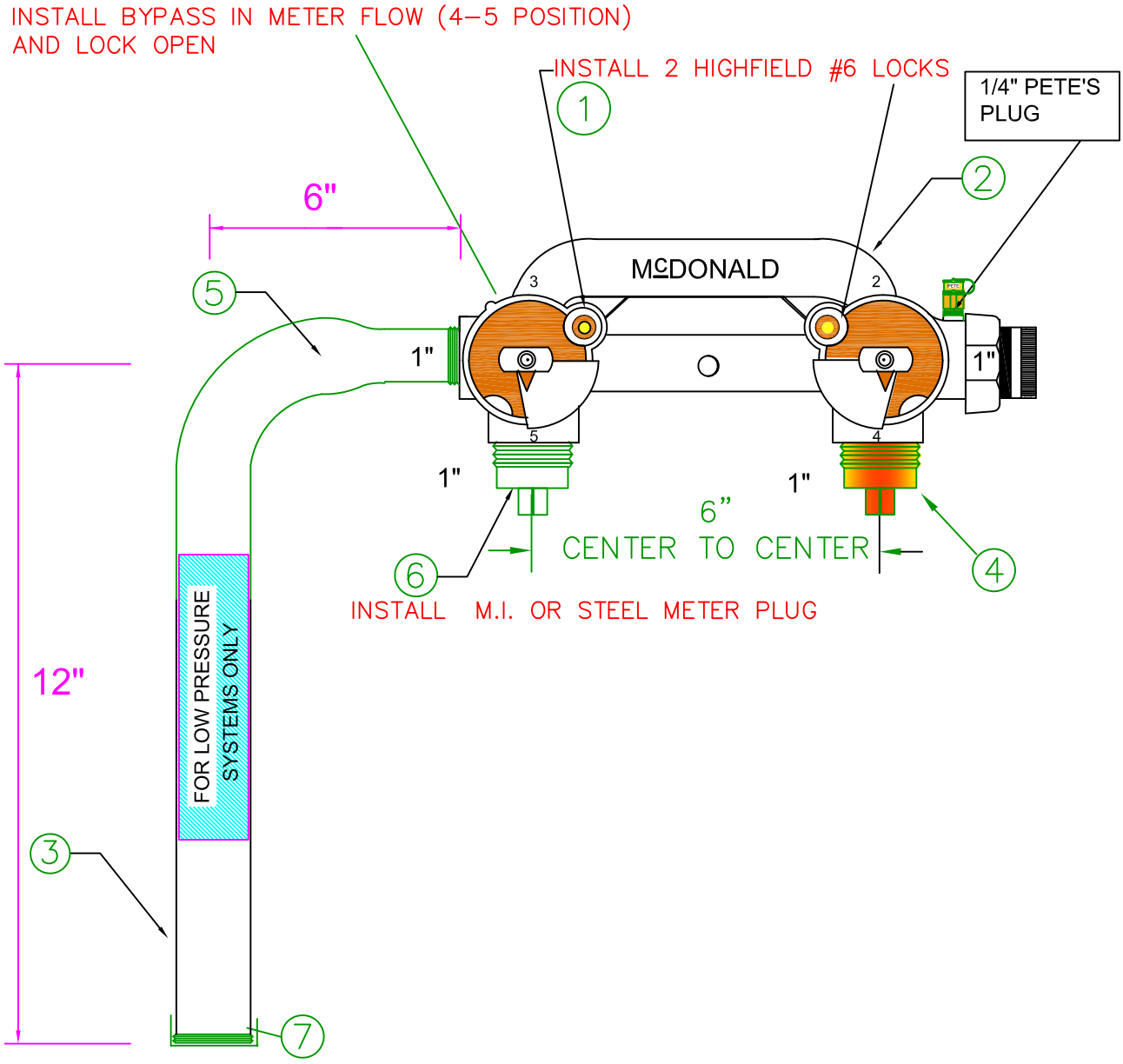
* NATIONAL GRID ITEM ID NOT REQUIRED ON LABELS.

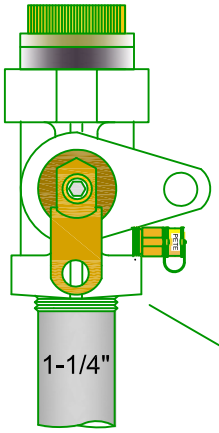
6. EACH PREFAB SET TO HAVE A 3" LONG X 1" HIGH YELLOW STICKER AND BLACK LETTERING (.25" HIGH) PLACED ON THE REGULATOR TOP OF THE DIAPHRAGM) SAYING:

"FOR 7.5-30 PSIG MAOP SYSTEMS"

ITEM	DESCRIPTION	SIZE	QTY
8	REGULATOR AMERICAN 1813B2 WITH ¼" ORIFICE, 5.5 – 8.5" W.C., YELLOW SPRING SET @ 7" W.C. 1" VENT POSITION C VENT. YELLOW SPRING CAP. ALUMINUM TAG INDICATING DATE OF MFGR, ORIFICE SIZE, 30 PSIG MAX, and SPRING RANGE. Or REGULATOR FISHER HSR WITH 1/4" ORIFICE, 6.0 – 8.0" W.C., YELLOW SPRING SET @ 7" W.C. 1" VENT POSITION 3 VENT. GREEN SPRING CAP SIZE, 30 PSIG MAX, and SPRING RANGE. IN ADDITION EACH REGULATOR SHALL HAVE A YELLOW STICKER SAYING "FOR 7.5 – 30 PSIG MAOP SYSTEMS"	1" X 1"	1
7	PLASTIC PLUG PRORTECTOR	1"	1
6	PLUG, M.I. OR STEEL	1"	1
5	BEND, SCHEDULE 40, API-5L GRADE B, CARBON STEEL 6" RADIUS, MALE THREADS BOTH ENDS	1"	1
4	PLASTIC PROTECTOR CAPS - 1"	1"	1
3	NIPPLE, SCHEDULE 40, API-5L GRADE B, CARBON STEEL, 6" LONG. MALE THREADS BOTH ENDS	1"	1
2	METER BAR ASSEMBLY, AY MCDONALD **WITH BYPASS** MODEL 4824-203 6410-FFD 1X1X1 BLK HxH – WITH ¼"PETE'S PLUG - TO BE IN POSITION 5 - 4 METER FLOW POSITION LOCKED OPEN.	1" X 1" X 1"	1
1	LOCKS – BULLET – HIGHFIELD #6 PART # 93180125-WS	-	2
NO.	**ITEM**	**NGG CODE NO.**	

BILL OF MATERIAL





1–1/4" RISER INLET VALVE WITH TAP
AND ⅛" PETE'S PLUG FOR INLET PRESSURE TEST PORT

nationalgrid

MA

SIZE 250 and 400 PREFABRICATED SINGLE METER SET WITH BYPASS FOR LOW PRESSURE SYSTEMS

REVISIONS: REV. 1: REMOVED METER BAR AND SWIVELS. ADDED STICKER

DATE: 05/1/2018	EFFECTIVE DATE: 05/1/2018
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6606
DRAWN: PAUL GUGLIOTTA	

NOTES:

1. LEAK TEST METER SET TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED

2. 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.
   NOTE: DO NOT PAINT OVER MOVEABLE PARTS AND OVER METER BAR BARREL LOCK INSERTS.

3. FOR ITEM #4: USE A PLASTIC THREAD PROTECTOR.

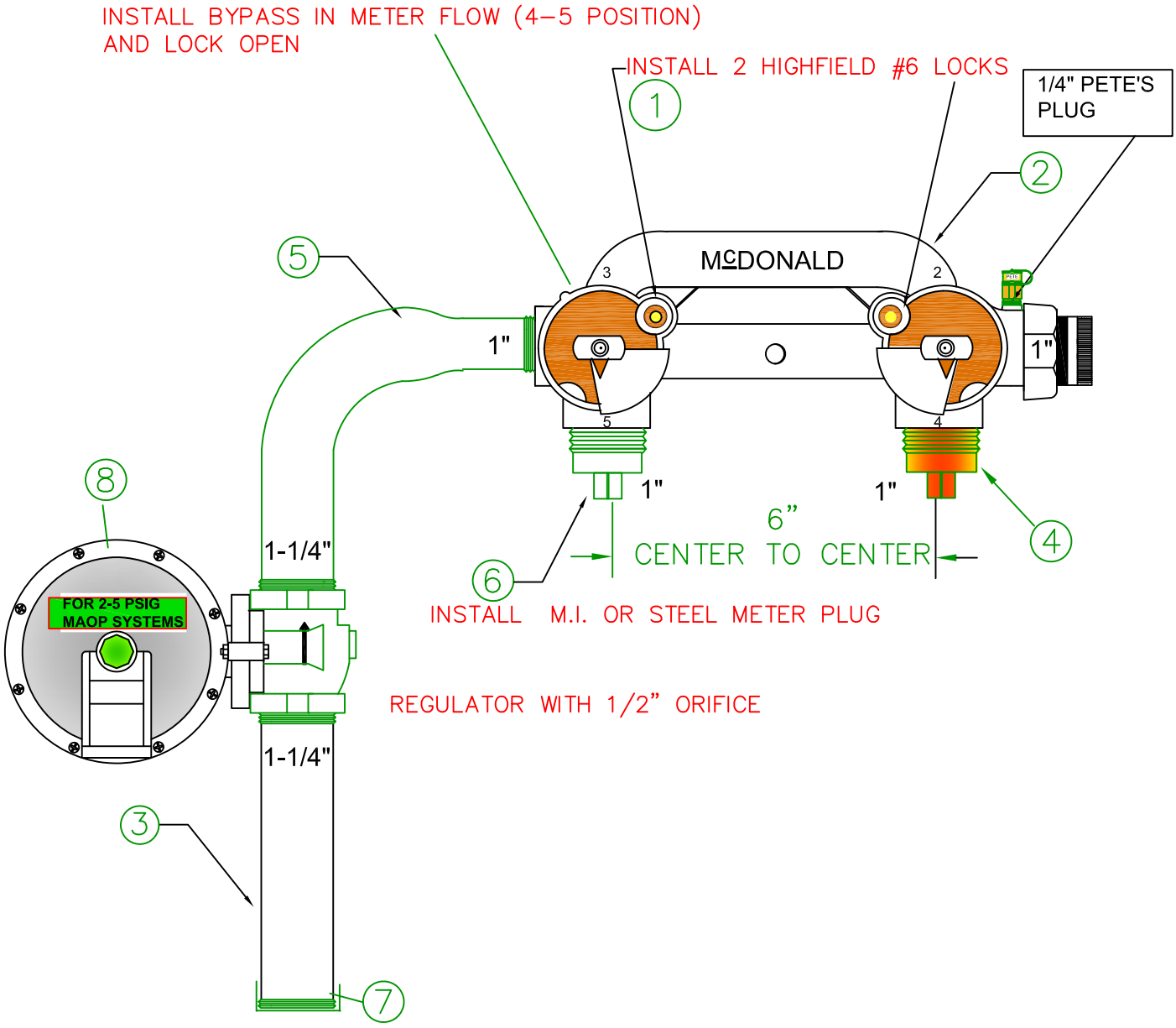
4. INSTALL A LAMINATED LABEL ON EACH ASSEMBLY AS FOLLOWS FOR EACH ITEM ID SPECIFIED:

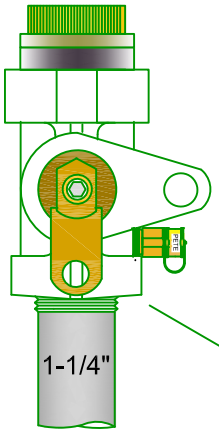
NATIONAL GRID ITEM ID: 9324692
SYSTEM: MAOP LOW PRESSURE

INSTALL BLUE STICKER SAYING “FOR LOW PRESSURE SYSTEM ONLY”

ITEM	DESCRIPTION	SIZE	QTY
7	PLASTIC PLUG PRORTECTOR	1-1/4”	1
6	PLUG, M.I. OR STEEL	1”	1
5	BEND, SCHEDULE 40, API-5L GRADE B, CARBON STEEL 6” RADIUS X 12” LONG - MALE THREADS BOTH ENDS	1-1/4” X 1”	1
4	PLASTIC PROTECTOR CAPS – 1”	1”	1
3	NIPPLE, SCHEDULE 40, API-5L GRADE B, CARBON STEEL, 6” LONG. MALE THREADS BOTH ENDS	1-1/4”	1
2	METER BAR ASSEMBLY, AY MCDONALD **WITH BYPASS** MODEL 4824-203 6410-FFD 1X1X1 BLK HxH WITH ¼” PETE’S PLUG – TO BE IN POSITION 5 - 4 METER FLOW POSITION LOCKED OPEN.	1” X 1” X 1”	1
1	LOCKS – BULLET – HIGHFIELD #6 PART # 93180125-WS	-	2
NO.	**ITEM**	**NGG CODE NO.**	

BILL OF MATERIAL





1–1/4" RISER INLET VALVE WITH TAP
AND ⅛" PETE'S PLUG FOR INLET PRESSURE TEST PORT

nationalgrid

MA

SIZE 250 and 400 PREFABRICATED SINGLE METER SET WITH BYPASS FOR 2 TO 5 PSIG SYSTEMS

REVISIONS: ADDED ITRON B31R AS ALTERNATE REGULATOR

DATE: 05/1/2018	EFFECTIVE DATE: 05/1/2022
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6609
DRAWN: PAUL GUGLIOTTA	

NOTES:

1. LEAK TEST METER SET TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED

2. 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. NOTE: DO NOT PAINT OVER MOVEABLE PARTS AND OVER METER BAR BARREL LOCK INSERTS.

REGULATOR SPECIFICATION:

REGULATOR MODEL	MAX. INLET PRESSURE	DESIGN INLET PRESSURE	DESIGN FLOW RATE	ORIFICE DIAMETER	SPRING RANGE	SET POINT
AMERICAN 1813B2 OR FISHER HSR OR ITRON B31R	5 PSIG	1/2 PSIG MIN.	400 SCFH	**9/16”**	SEE NOTE #3	7” W.C.

DESIGN INLET PRESSURE IS THE INLET PRESSURE THAT THE REGULATOR MANUFACTURER SHALL USE TO SET THE SET POINT.

3. SPRING RANGE SHALL BE SUCH THAT THE 7” W.C. SET POINT EXIST BETWEEN 40% AND 60% OF ITS ESTABLISHED RANGE

4. FOR ITEM #4: USE A PLASTIC THREAD PROTECTOR.

5. INSTALL A LAMINATED LABEL ON EACH ASSEMBLY AS FOLLOWS FOR EACH ITEM ID SPECIFIED:

NATIONAL GRID ITEM ID: 9324840
SYSTEM: 2-5 PSIG MAOP
SET PRESSURE: 7” W.C.

* NATIONAL GRID ITEM ID NOT REQUIRED ON LABELS.

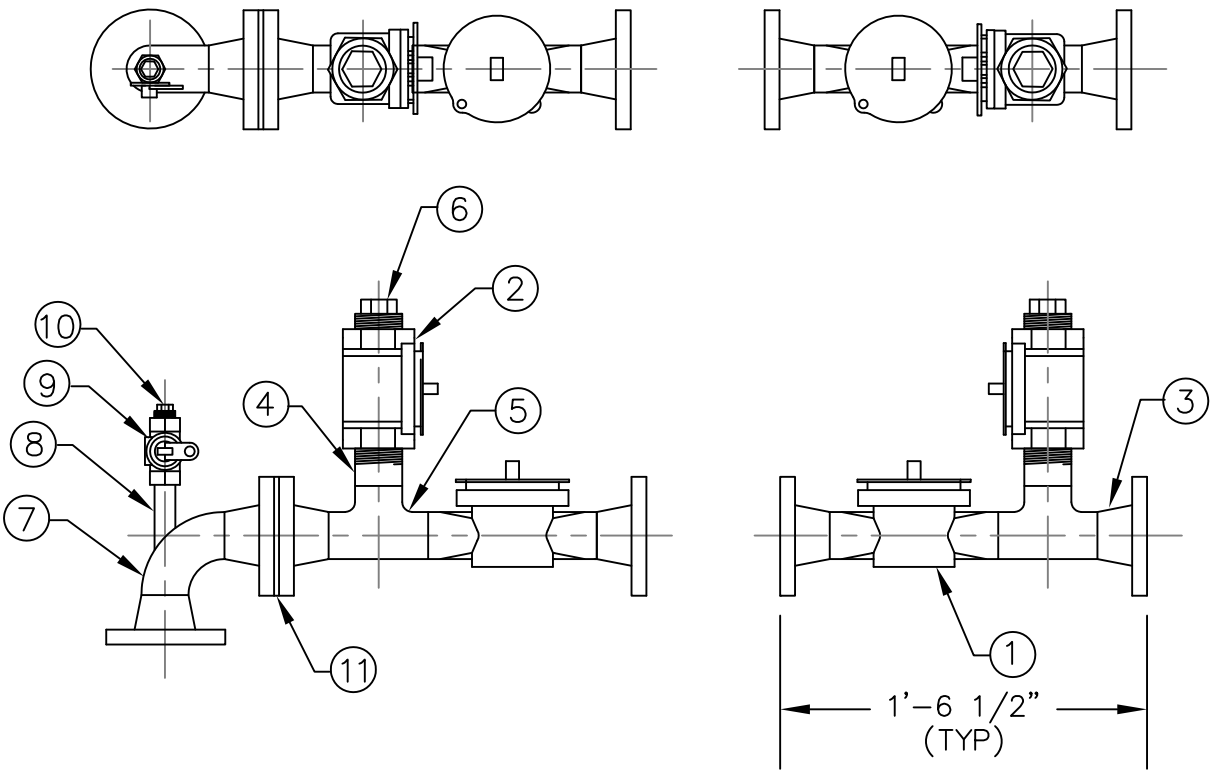
6. EACH PREFAB SET TO HAVE A 3" LONG X 1" HIGH GREEN STICKER AND BLACK LETTERING (.25" HIGH) PLACED ON THE REGULATOR TOP OF THE DIAPHRAGM) SAYING:

“FOR 2-5 PSIG MAOP SYSTEMS”

ITEM	DESCRIPTION	SIZE	QTY
8	REGULATOR AMERICAN 1813B2 WITH 9/16” ORIFICE, 5.5 – 8.5” W.C., YELLOW SPRING SET @ 7” W.C. 1” VENT POSITION C VENT. GREEN SPRING CAP. ALUMINUM TAG INDICATING DATE OF MFGR, ORIFICE SIZE, 5 PSIG MAX, and SPRING RANGE. Or REGULATOR FISHER HSR WITH 1/2” ORIFICE, 6.0 – 8.0” W.C., YELLOW SPRING SET @ 7” W.C. 1” VENT POSITION 3 VENT. GREEN SPRING CAP. ALUMINUM TAG INDICATING DATE OF MFGR, ORIFICE SIZE, 5 PSIG MAX, and SPRING RANGE. Or ITRON B31R WITH ½” ORIFICE, 5.5-8.0 “ W.C. LIGGHT GREEN PSRING SET @ 7” W.C. 1” VENT POSITON 5 (FLOW UP / VENT DOWN) GREEN SPRING CAP. ALUMINUM TAG INDICATING DATE OF MFGR, ORIFICE SIZE, 5 PSIG MAX, and SPRING RANGE. IN ADDITION EACH REGULATOR SHALL HAVE A GREEN STICKER SAYING “2 - 5 PSIG MAOP SYSTEMS”	1-1/4’ X1-1/4”	1
7	PLASTIC PLUG PRORTECTOR	1-1/4”	1
6	PLUG, M.I. OR STEEL	1”	1
5	BEND, SCHEDULE 40, API-5L GRADE B, CARBON STEEL 6” RADIUS, MALE THREADS BOTH ENDS	1-1/4” X 1”	1
4	PLASTIC PROTECTOR CAPS – ¾”	1”	1
3	NIPPLE, SCHEDULE 40, API-5L GRADE B, CARBON STEEL, 6” LONG. MALE THREADS BOTH ENDS	1-1/4”	1
2	METER BAR ASSEMBLY, AY MCDONALD **WITH BYPASS** MODEL 4824-203 6410-FFD 1X1X1 BLACK WITH ¼” PETE’S PLUG – TO BE IN POSITION 5 - 4 METER FLOW POSITION LOCKED OPEN.	1” X 1” X 1”	1
1	LOCKS – BULLET – HIGHFIELD #6 PART # 93180125-WS	-	2
NO.	**ITEM**	**NGG CODE NO.**	

BILL OF MATERIAL

ITEM	QTY.	SIZE	DESCRIPTION
1	2	2"	ROOTS STYLE 350 "ULTRASEAL" WELD END VALVE w/LOCK PLATE
2	2	2"	ROOTS STYLE 350 "ULTRASEAL" FIPS END VALVE w/LOCK PLATE
3	6	2"	FLANGE, WELD-NECK, FLAT-FACE
4	2	2"	NIPPLE, WELDxTHREAD, 3" LONG
5	2	2"	TEE, WELD END
6	2	2"	PIPE PLUG
7	1	2"	ELBOW, 90°, LONG RADIUS
8	1	3/4"	NIPPLE, WELDxTHREAD, 3" LONG
9	1	3/4"	DRESSER 275 VALVE w/LOCK-WING
10	1	3/4"	PIPE PLUG
11	1	2"	DRESSER GASKET STRAINER
12	12	5/8"x2-1/2"	HEX HEAD BOLTS
13	8	5/8"x1-3/4"	HEX HEAD METER BOLTS
14	12	5/8"	HEX NUTS
15	4	2"	GASKET, 1/16" NON-ASBESTOS



NATIONAL GRID ITEM ID 8076600

nationalgrid MA-NH

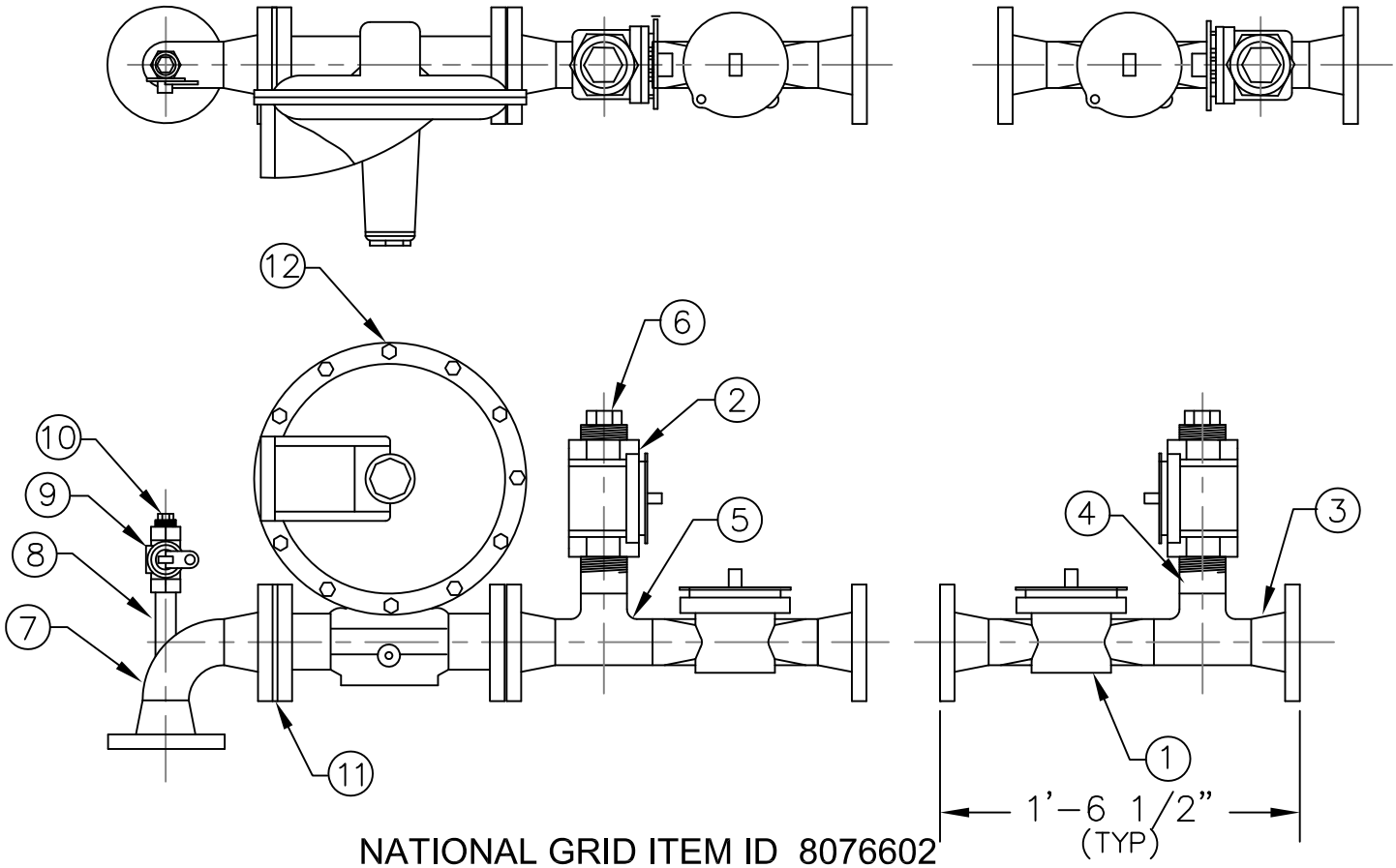
PREFABRICATED METER SET ROTARY METER, LOW PRESSURE

REVISIONS: NEW DRAWING
REPLACES STD-CI-LP

DATE: 12/01/2006	EFFECTIVE DATE: 12/01/2006
DESIGN: C.M.F.	STD. DWG. NO. MTRS-6611
DRAWN: C.M.F.	

ITEM	QTY.	SIZE	DESCRIPTION
1	2	2"	ROOTS STYLE 350 "ULTRASEAL" WELD END VALVE w/LOCK PLATE
2	2	2"	ROOTS STYLE 350 "ULTRASEAL" FIPS END VALVE w/LOCK PLATE
3	6	2"	FLANGE, WELD-NECK, FLAT-FACE, STEEL, STD. BORE A-105
4	2	2"	NIPPLE, WELDxTHREAD, 3" LONG, SCH 40 PER A-53/A106
5	2	2"	TEE, WELD END, PER ASTM A-234 WPB
6	2	2"	PIPE PLUG
7	1	2"	ELBOW, 90°, LONG RADIUS, PER A-234 WPB
8	1	3/4"	NIPPLE, WELDxTHREAD, 3" LONG, SCH 40 PER A-53/A105
9	1	3/4"	DRESSER 275 VALVE w/LOCK-WING
10	1	3/4"	PIPE PLUG
11	1	2"	DRESSER GASKET STRAINER
12	1	2"	REGULATOR AMERICAN METER MODEL 1813B 2" FLANGED WITH 3/8" ORIFICE, 5.5 – 8" W.C. SPRING SET AT 6" W.C. ASSEMBLY C-2 POSITION. TO BE LABELLED "60 PSIG MAX. INLET" – OR – REGULATOR ITRON/ACTARIS MODEL B38R 2" FLANGED WITH 3/8" ORIFICE, GREEN SPRING SET AT 6" W.C. POS. #5, TO BE LABELLED "125 PSIG MAX. INLET"
13	16	5/8"x2-1/2"	HEX HEAD BOLTS
14	8	5/8"x1-3/4"	HEX HEAD METER BOLTS
15	16	5/8"	HEX NUTS

NOTE: ACTARIS AND AMERICAN REGULATORS HAVE DIFFERENT MAXIMUM INLET PRESSURE RATINGS IF USING AMERICAN REGULATOR > 60 PSIG TO 125 PSIG, CHANGE ORIFICE TO 1/4"



NATIONAL GRID ITEM ID 8076602

THIS DRAWING REPLACES STD-CI-HP

nationalgrid

MA-NH

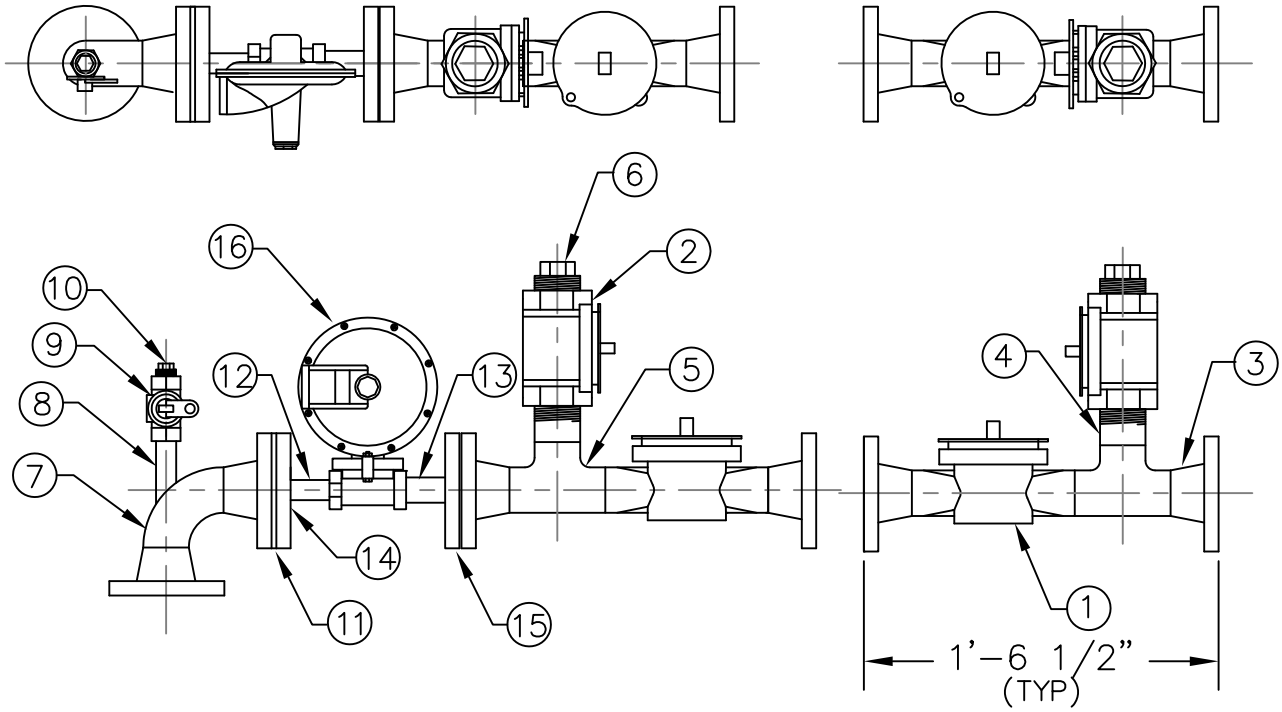
PREFABRICATED METER SET ROTARY METER, 2" REGULATOR

REVISIONS: CLARIFIED NOTES AND DESCRIPTIONS

DATE: 12/01/2006	EFFECTIVE DATE: 12/14/2006
DESIGN: C.M.F.	STD. DWG. NO. MTRS-6612
DRAWN: C.M.F.	

ITEM	QTY.	SIZE	DESCRIPTION
1	2	2"	ROOTS STYLE 350 "ULTRASEAL" WELD END VALVE w/LOCK PLATE
2	2	2"	ROOTS STYLE 350 "ULTRASEAL" FIPS END VALVE w/LOCK PLATE
3	6	2"	FLANGE, WELD-NECK, FLAT-FACE, STEEL, STD. BORE A-105
4	2	2"	NIPPLE, WELDxTHREAD, 3" LONG, SCH. 40, A-53/A-106
5	2	2"	TEE, WELD END, STEEL, STD. WALL, A-234 WPB
6	2	2"	PIPE PLUG, STEEL A-105
7	1	2"	ELBOW, 90°, LONG RADIUS, STD. WALL, A-234 WPB
8	1	3/4"	NIPPLE, WELDxTHREAD, 3" LONG SCH. 40, A-53/A-106
9	1	3/4"	DRESSER 275 VALVE w/LOCK-WING
10	1	3/4"	PIPE PLUG
11	1	2"	DRESSER GASKET STRAINER
12	1	3/4"	NIPPLE, THREADED, 3" LONG, SCH. 40 A-53/A-106
13	1	1"	NIPPLE, THREADED, 3" LONG, SCH. 40 A-53/A-106
14	1	2"x3/4"	REDUCING FLANGE, THREADED
15	1	2"x1"	REDUCING FLANGE, THREADED
16	1	3/4"x1"	REGULATOR AMERICAN MODEL 1813C 1/8"X3/16" ORIF., VENT C2 POS. SCREWED, STRAIGHT BODY, 5.5" – 8.5" SPRING SET @ 6" W.C. TO BE LABELLED "125 PSIG MAX INLET" – OR – REGULATOR ITRON/ACTARIS MODEL B42R 1/8" ORIFICE VENT POS. #5 SCREWED, STRAIGHT BODY 5" – 7" SPRING SET @ 6" W.C. TO BE LABELLED "125 PSIG MAX INLET"

REGULATOR CAPACITY	
INLET PRESSURE	CAPACITY
20 PSIG	500 CFH
30 PSIG	670 CFH
60 PSIG	1110 CFH
80 PSIG	1500 CFH
100 PSIG	1750 CFH



NATIONAL GRID ITEM ID 8076604

THIS DRAWING REPLACES STD-CI-HP-1

nationalgrid MA-NH

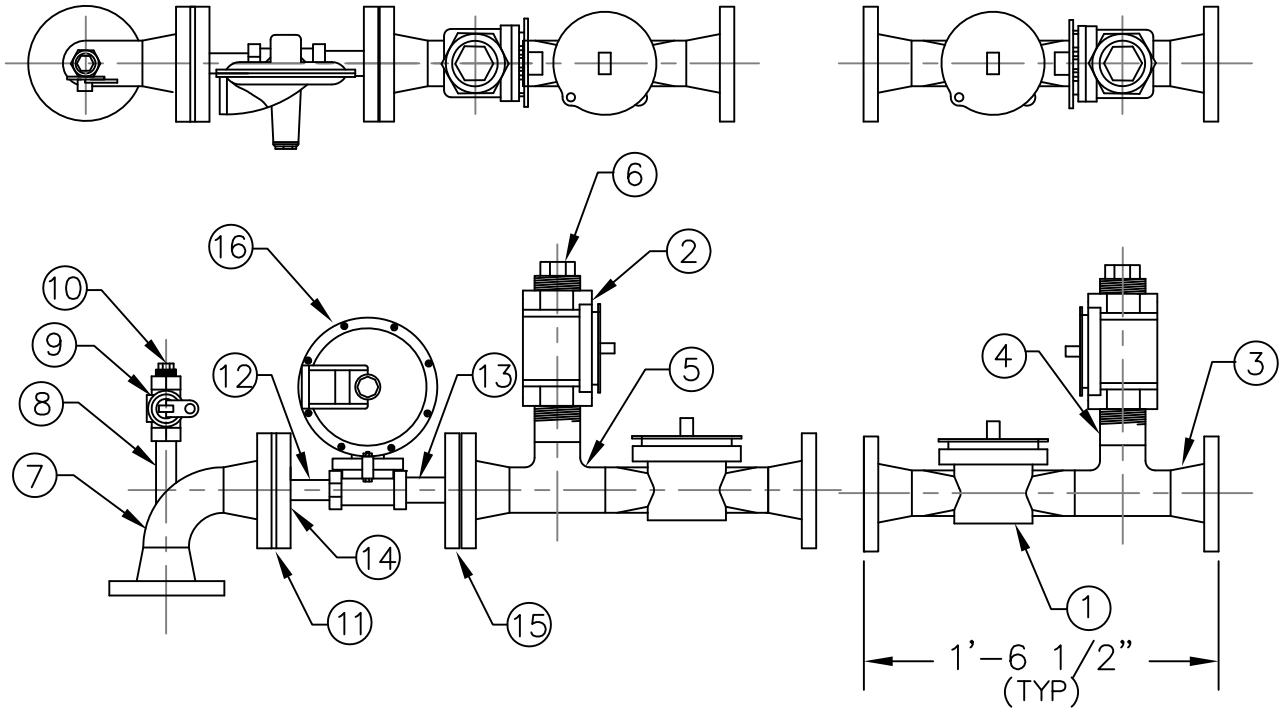
PREFABRICATED METER SET
ROTARY METER, $\frac{3}{4}$" X 1" REGULATOR

REVISIONS: CLARIFIED SPECIFICATIONS

DATE: 12/01/2006	EFFECTIVE DATE: 12/15/2006
DESIGN: C.M.F.	STD. DWG. NO. MTRS-6613
DRAWN: C.M.F.	

ITEM	QTY.	SIZE	DESCRIPTION
1	2	2"	ROOTS STYLE 350 "ULTRASEAL" WELD END VALVE w/LOCK PLATE
2	2	2"	ROOTS STYLE 350 "ULTRASEAL" FIPS END VALVE w/LOCK PLATE
3	6	2"	FLANGE, WELD-NECK, FLAT-FACE, STEEL, STD. BORE A-105
4	2	2"	NIPPLE, WELDxTHREAD, 3" LONG, SCH. 40, A-53/A-106
5	2	2"	TEE, WELD END, STEEL, STD. WALL, A-234 WPB
6	2	2"	PIPE PLUG, STEEL A-105
7	1	2"	ELBOW, 90°, LONG RADIUS, STD. WALL, A-234 WPB
8	1	3/4"	NIPPLE, WELDxTHREAD, 3" LONG SCH. 40, A-53/A-106
9	1	3/4"	DRESSER 275 VALVE w/LOCK-WING
10	1	3/4"	PIPE PLUG
11	1	2"	DRESSER GASKET STRAINER
12	1	3/4"	NIPPLE, THREADED, 3" LONG, SCH. 40 A-53/A-106
13	1	1"	NIPPLE, THREADED, 3" LONG, SCH. 40 A-53/A-106
14	1	2"x3/4"	REDUCING FLANGE, THREADED
15	1	2"x1"	REDUCING FLANGE, THREADED
16	1	3/4"x1"	REGULATOR AMERICAN MODEL 1813C 1/8"X3/16" ORIF., VENT C2 POS. SCREWED, STRAIGHT BODY, 5.5" – 8.5" SPRING SET @ 6" W.C. TO BE LABELLED "125 PSIG MAX INLET" – OR – REGULATOR ITRON/ACTARIS MODEL B42R 1/8" ORIFICE VENT POS. #5 SCREWED, STRAIGHT BODY 5" – 7" SPRING SET @ 6" W.C. TO BE LABELLED "125 PSIG MAX INLET"

REGULATOR CAPACITY	
INLET PRESSURE	CAPACITY
20 PSIG	500 CFH
30 PSIG	670 CFH
60 PSIG	1110 CFH
80 PSIG	1500 CFH
100 PSIG	1750 CFH



NATIONAL GRID ITEM ID 8076604

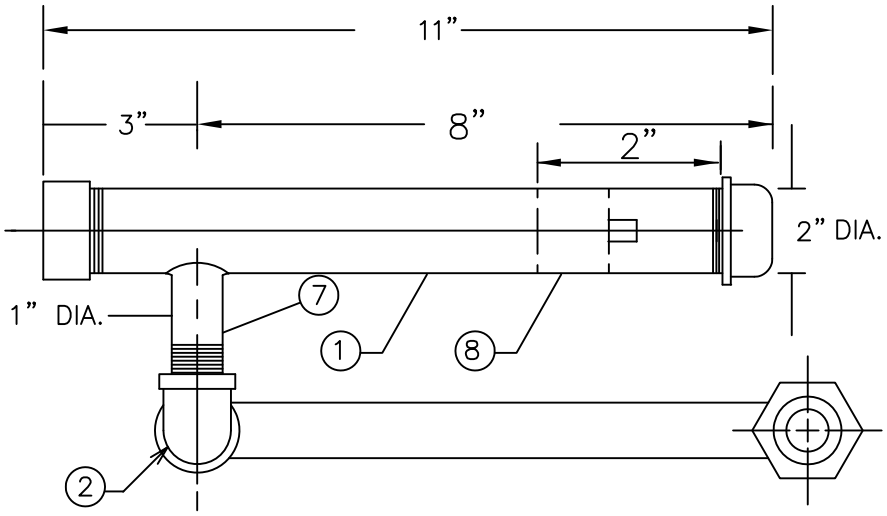
THIS DRAWING REPLACES STD-CI-HP-1

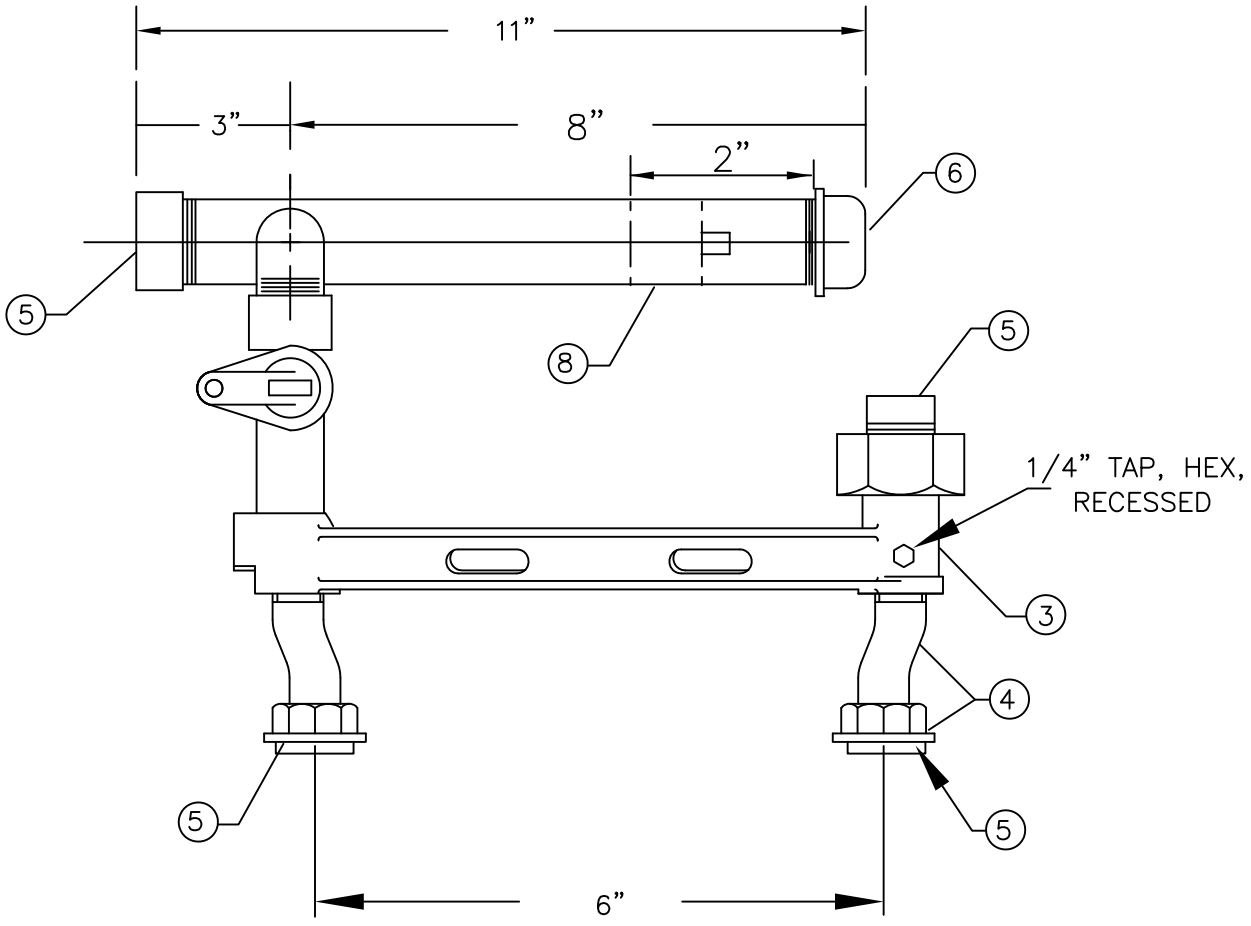
nationalgrid MA-NH

PREFABRICATED METER SET
ROTARY METER, $\frac{3}{4}$" X 1" REGULATOR

REVISIONS: CLARIFIED SPECIFICATIONS

DATE: 12/01/2006	EFFECTIVE DATE: 12/15/2006
DESIGN: C.M.F.	STD. DWG. NO. MTRS-6613
DRAWN: C.M.F.	





nationalgrid

MA

PREFABRICATED SINGLE MANIFOLD
STD-LP-250-1

REVISIONS: REVISED USING SAP ITEM ID #'S	DATE: 05/23/2005	EFFECTIVE DATE: 09/15/2013
	DESIGN: G.J.H.	STD. DWG. NO. **MTRS-6620**
	DRAWN: G.J.H.	

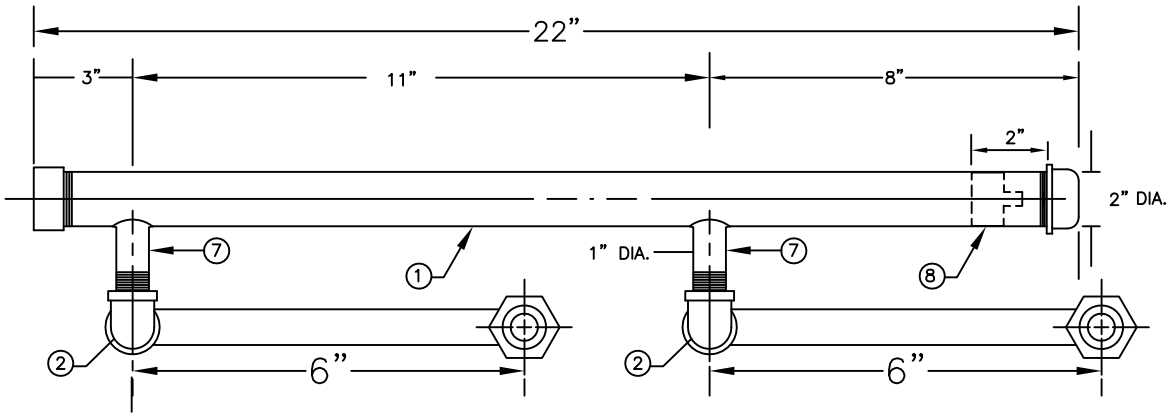
NOTES:

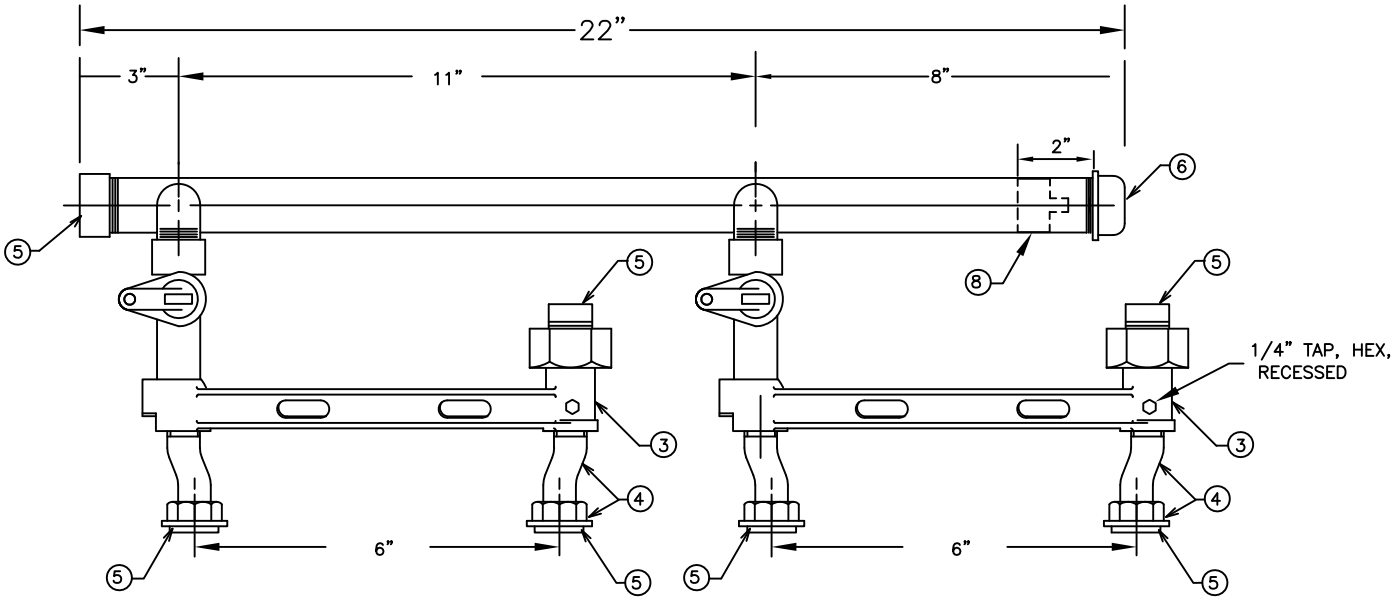
A. PRESSURE TEST AT 90 PSIG FOR 15 MINUTES. LEAK TEST METER SETS TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED.
B. SURFACE PREPARATION, PRIMING AND PAINTING SPECIFICATION: ALL SURFACES SHALL BE SOLVENT CLEANED IN ACCORDANCE WITH SSPC SP#1 STANDARD TO REMOVE ALL SOLUBLE SURFACE CONTAMINATES. APPLICATION SHALL BE ONE COAT OF SOLVENT-BASED ASA#49 GRAY ACRYLIC ENAMEL. MINIMUM 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID PROJECT ENGINEERING.
C. FOR ITEM 4, BOSTON, ESSEX AND LOWELL DIVISION ASSEMBLY, USE 10 LT. CAP
D. PRIOR TO THE START OF FABRICATION, THE SUPPLIER SHALL SUBMIT TO NATIONAL GRID, WELDER CERTIFICATION DOCUMENTS SATISFACTORY TO NATIONAL GRID FOR EACH OF THE WELDERS EMPLOYED ON THE PROJECT.
E. WELDING SHALL BE IN ACCORDANCE WITH NATIONAL GRID'S WELDING PROCEDURE, 49CFR PART 192 – TRANSPORTATION OF NATURAL GAS AND OTHER GAS BY PIPELINES: MINIMUM SAFETY STANDARDS 220CMR101, DEPARTMENT OF PUBLIC UTILITIES, GENERAL REQUIREMENTS: API 1104 – WELDING OF PIPELINES AND RELATED FACILITIES. OTHER WELDING PROCEDURES MUST BE APPROVED BY NATIONAL GRID PRIOR TO FABRICATION.
F. ALL WELD TESTING SHALL BE DONE IN ACCORDANCE WITH API STANDARD 1104 – WELDING OF PIPELINES AND RELATED FACILITIES.

ITEM ID 9323910 (FORMALLY ORACLE 301350)

ITEM	DESCRIPTION	SIZE	QUANTITY
1	SINGLE MANIFOLD, SCHEDULE 40, API 5L GRADE B, CARBON STEEL, MALE THREADS BOTH ENDS	2"	1
2	STREET ELBOW, MALLEABLE IRON	1"	1
3	METER BAR ASSEMBLY, MUELLER, BA-22-LTM, MODEL 701318 OR EQUAL	1" X 1" X ¾"	1
4	CAP AND SWIVEL, ¾" X 1-1/4" OFFSET, STANDARD GASKET, 10 LT	SEE NOTE C	2
5	PLC THREAD PROTECTOR	VARIOUS	4
6	THREADED CAP, MALLEABLE IRON	2"	1
7	NIPPLE, SCHEDULE 40, API-5L, GRADE B, CARBON STEEL, 2" LONG, MALE THREADS ONE END	1"	1
8	EXPANDABLE SAFETY PLUG (FURNISHED AND INSTALLED BY NATIONAL GRID)	2"	ITEM ID 9353483
No.	**ITEM**		

BILL OF MATERIAL





nationalgrid

MA

PREFABRICATED DOUBLE MANIFOLD
STD-LP-500-2

REVISIONS: REVISED USING SAP ITEM ID'S

DATE: 05/23/2005	EFFECTIVE DATE: 05/23/2005
DESIGN: G.J.H.	STD. DWG. NO. **MTRS-6621**
DRAWN: G.J.H.	

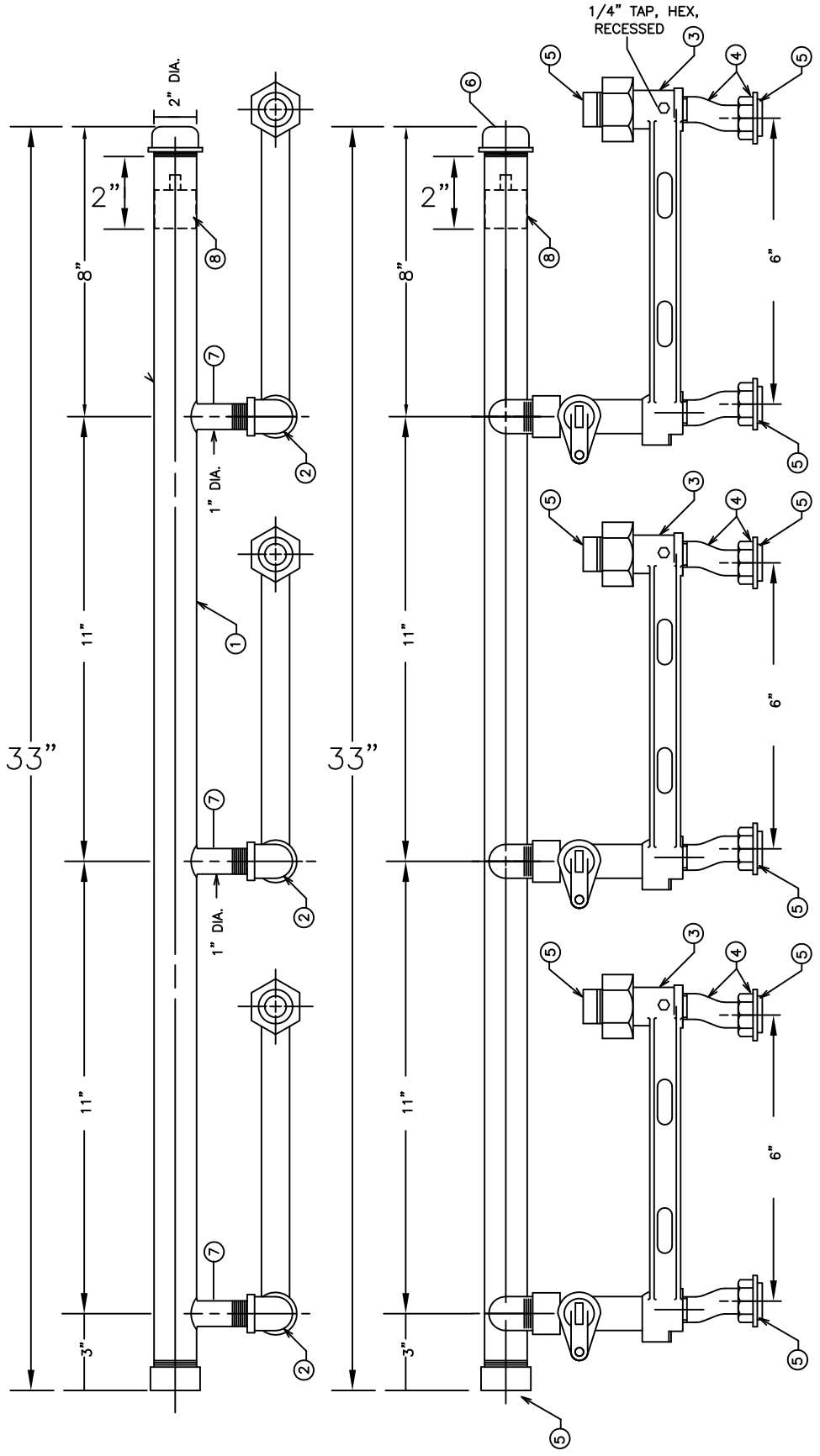
NOTES:

A. PRESSURE TEST AT 90 PSIG FOR 15 MINUTES. LEAK TEST METER SETS TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED.
B. 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 ASA#49 GRAY ACRYLIC ENAMEL. MINIMUM 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID PROJECT ENGINEERING.
C. FOR ITEM 4, BOSTON, ESSEX AND LOWELL DIVISION ASSEMBLY, USE 10 LT. CAP
D. PRIOR TO THE START OF FABRICATION, THE SUPPLIER SHALL SUBMIT TO NATIONAL GRID, WELDER CERTIFICATION DOCUMENTS SATISFACTORY TO NATIONAL GRID FOR EACH OF THE WELDERS EMPLOYED ON THE PROJECT.
E. WELDING SHALL BE IN ACCORDANCE WITH NATIONAL GRID'S WELDING PROCEDURE, 49CFR PART 192 – TRANSPORTATION OF NATURAL GAS AND OTHER GAS BY PIPELINES: MINIMUM SAFETY STANDARDS 220CMR101, DEPARTMENT OF PUBLIC UTILITIES, GENERAL REQUIREMENTS: API 1104 – WELDING OF PIPELINES AND RELATED FACILITIES. OTHER WELDING PROCEDURES MUST BE APPROVED BY NATIONAL GRID PRIOR TO FABRICATION.
F. ALL WELD TESTING SHALL BE DONE IN ACCORDANCE WITH API STANDARD 1104 – WELDING OF PIPELINES AND RELATED FACILITIES.

ITEM ID 9323911

ITEM	DESCRIPTION	SIZE	QUANTITY
1	DOUBLE MANIFOLD, SCHEDULE 40, API 5L GRADE B, CARBON STEEL, MALE THREADS BOTH ENDS	2"	1
2	STREET ELBOW, MALLEABLE IRON	1"	2
3	METER BAR ASSEMBLY, MUELLER, BA-22-LTM, MODEL 701318 OR EQUAL	1" X 1" X ¾"	2
4	CAP AND SWIVEL, ¾" X 1-1/4" OFFSET, STANDARD GASKET, 10 LT	SEE NOTE C	4
5	PLC THREAD PROTECTOR	VARIOUS	7
6	THREADED CAP, MALLEABLE IRON	2"	1
7	NIPPLE, SCHEDULE 40, API-5L, GRADE B, CARBON STEEL, 2" LONG, MALE THREADS ONE END	1"	2
8	EXPANDABLE SAFETY PLUG (FURNISHED AND INSTALLED BY NATIONAL GRID)	2"	ITEM ID 9353483
No.	**ITEM**		

BILL OF MATERIAL



nationalgrid
MA

PREFABRICATED TRIPLE MANIFOLD
STD-LP-750-3

REVISIONS: REVISED USING SAP ITEM ID'S	DATE: 05/23/2005	EFFECTIVE DATE: 09/15/2013
	DESIGN: G.J.H.	STD. DWG. NO. MTRS-6622
	DRAWN: G.J.H.	

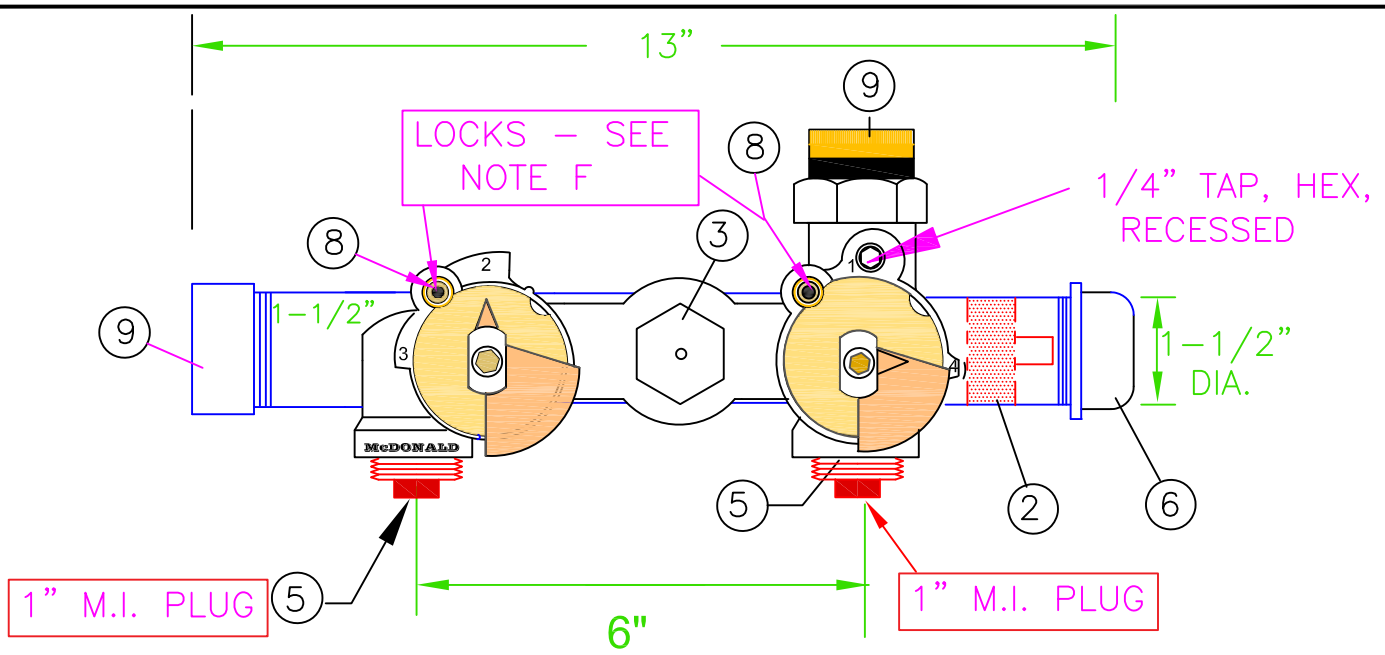
NOTES:

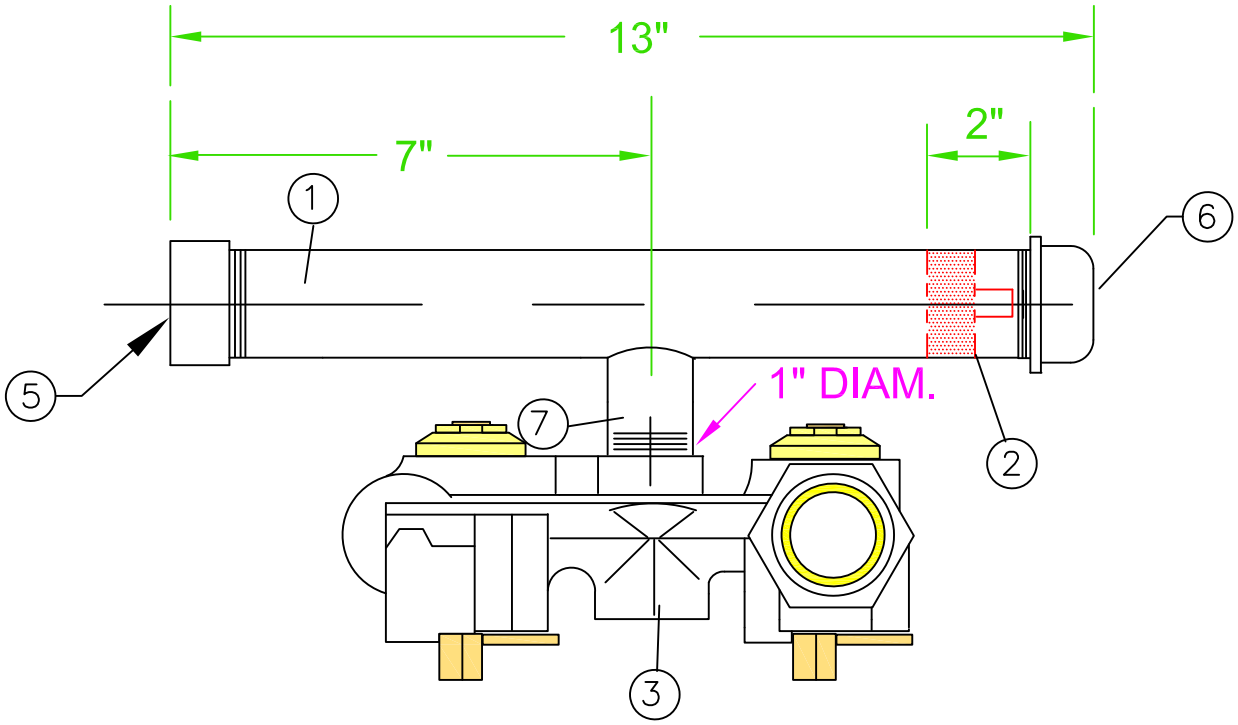
A. PRESSURE TEST AT 90 PSIG FOR 15 MINUTES. LEAK TEST METER SETS TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED.
B. SURFACE PREPARATION, PRIMING AND PAINTING SPECIFICATION: ALL SURFACES SHALL BE SOLVENT CLEANED IN ACCORDANCE WITH SSPC SP#1 STANDARD TO REMOVE ALL SOLUBLE SURFACE CONTAMINATES. APPLICATION SHALL BE ONE COAT OF SOLVENT-BASED ASA#49 GRAY ACRYLIC ENAMEL. MINIMUM 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID PROJECT ENGINEERING.
C. FOR ITEM 4, BOSTON, ESSEX AND LOWELL DIVISION ASSEMBLY, USE 10 LT. CAP
D. PRIOR TO THE START OF FABRICATION, THE SUPPLIER SHALL SUBMIT TO NATIONAL GRID, WELDER CERTIFICATION DOCUMENTS SATISFACTORY TO NATIONAL GRID FOR EACH OF THE WELDERS EMPLOYED ON THE PROJECT.
E. WELDING SHALL BE IN ACCORDANCE WITH NATIONAL GRID'S WELDING PROCEDURE, 49CFR PART 192 – TRANSPORTATION OF NATURAL GAS AND OTHER GAS BY PIPELINES: MINIMUM SAFETY STANDARDS 220CMR101, DEPARTMENT OF PUBLIC UTILITIES, GENERAL REQUIREMENTS: API 1104 – WELDING OF PIPELINES AND RELATED FACILITIES. OTHER WELDING PROCEDURES MUST BE APPROVED BY NATIONAL GRID PRIOR TO FABRICATION.
F. ALL WELD TESTING SHALL BE DONE IN ACCORDANCE WITH API STANDARD 1104 – WELDING OF PIPELINES AND RELATED FACILITIES.

ITEM ID 9323912 – FORMALLY ORACLE 00301352

ITEM	DESCRIPTION	SIZE	QUANTITY
1	TRIPLE MANIFOLD, SCHEDULE 40, API 5L GRADE B, CARBON STEEL	2"	1
2	STREET ELBOW, MALLEABLE IRON	1"	3
3	METER BAR ASSEMBLY, MUELLER, BA-22-LTM, MODEL 701318 OR EQUAL	1" X 1" X ¾"	3
4	CAP AND SWIVEL, ¾" X 1-1/4" OFFSET, STANDARD GASKET	SEE NOTE C	6
5	PLC THREAD PROTECTOR	VARIOUS	10
6	THREADED CAP, MALLEABLE IRON	2"	1
7	NIPPLE, SCHEDULE 40, API-5L, GRADE B, CARBON STEEL, 2" LONG, MALE THREADS ONE END	1"	3
8	EXPANDABLE SAFETY PLUG (FURNISHED AND INSTALLED BY NATIONAL GRID)	2"	ITEM ID 9353483
No.	**ITEM**		

BILL OF MATERIAL





THE METER BARS SHALL BE SUPPLIED IN THE POSITION AS SHOWN
INLET IN OFF POSITION

ITEM ID 9386061

nationalgrid MA

PREFABRICATED SINGLE 250/425 METER SET WITH REAR ENTRY BYPASS METER BAR - LOW PRESSURE

REVISIONS:
ELIMINATED SWIVELS. METER BAR CHANGED TO 1"X1"X1"
MADE APPLICABLE TO 425 METERS

DATE: 02/26/2010	EFFECTIVE DATE: 8/2/2021
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6623
DRAWN: PAUL GUGLIOTTA	

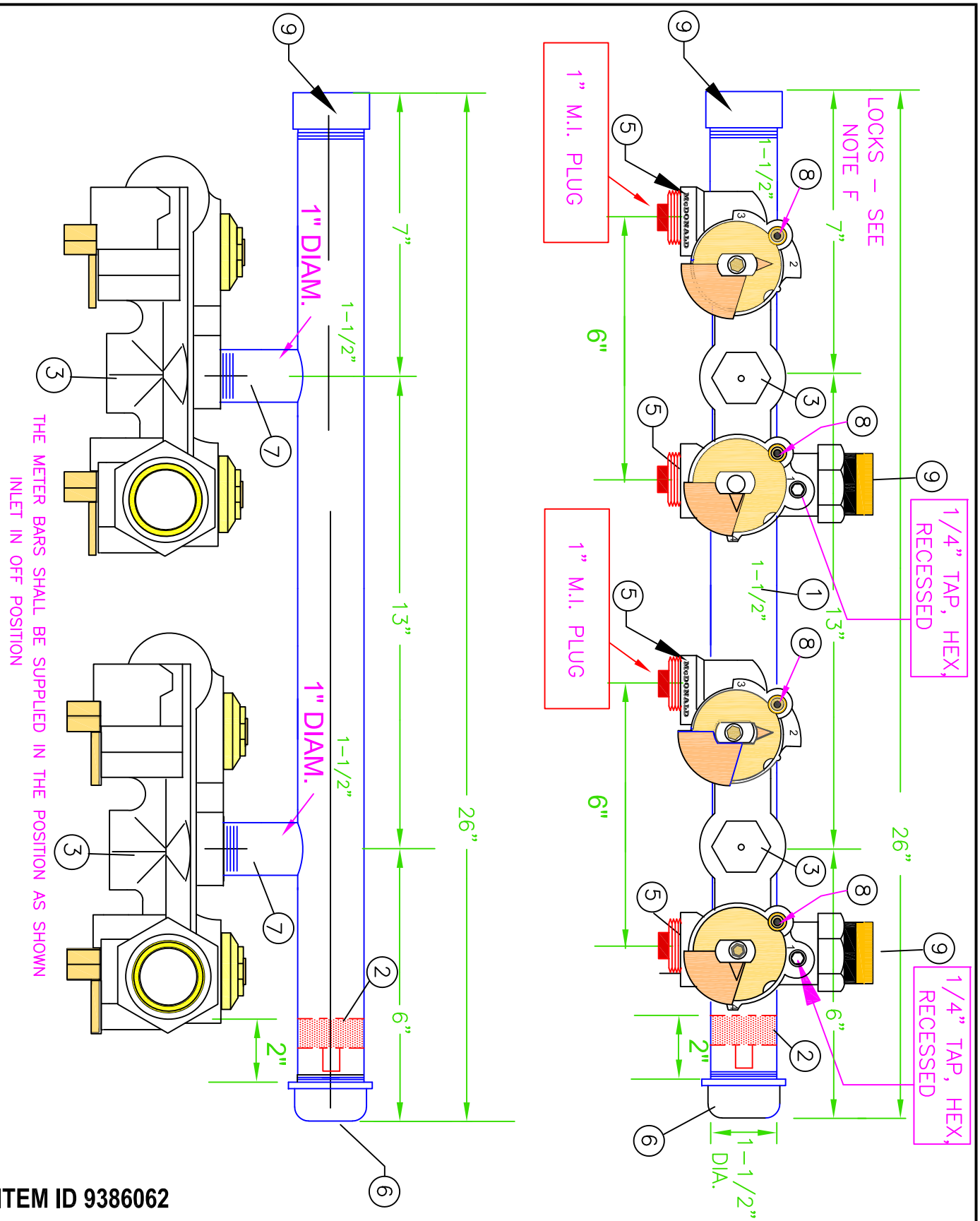
NOTES:

A. PRESSURE TEST AT 90 PSIG FOR 15 MINUTES. LEAK TEST METER SETS TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED.
B. 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 ASA#49 GRAY ACRYLIC ENAMEL. MINIMUM 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID PROJECT ENGINEERING.
C. PRIOR TO THE START OF FABRICATION, THE SUPPLIER SHALL SUBMIT TO NATIONAL GRID, WELDER CERTIFICATION DOCUMENTS SATISFACTORY TO NATIONAL GRID FOR EACH OF THE WELDERS EMPLOYED ON THE PROJECT.
D. WELDING SHALL BE IN ACCORDANCE WITH NATIONAL GRID'S WELDING PROCEDURE, 49CFR PART 192 – TRANSPORTATION OF NATURAL GAS AND OTHER GAS BY PIPELINES: MINIMUM SAFETY STANDARDS 220CMR101, DEPARTMENT OF PUBLIC UTILITIES, GENERAL REQUIREMENTS: API 1104 – WELDING OF PIPELINES AND RELATED FACILITIES. OTHER WELDING PROCEDURES MUST BE APPROVED BY NATIONAL GRID PRIOR TO FABRICATION.
E. ALL WELD TESTING SHALL BE DONE IN ACCORDANCE WITH API STANDARD 1104 – WELDING OF PIPELINES AND RELATED FACILITIES.
F. **METER BARS SHALL BE SUPPLIED IN THE POSITIONS AS SHOWN ON PAGE 1 (INLET OFF). BULLET LOCKS SHALL BE INSTALLED ON BOTH SIDES OF METER BAR AND PLASTIC PROTECTOR SHALL BE PLACED ON LOCKS PRIOR TO PAINTING.**

ITEM ID 9386061

ITEM	DESCRIPTION	SIZE	QUANTITY
1	SINGLE MANIFOLD, SCHEDULE 40, API 5L GRADE B, CARBON STEEL, MALE THREADS BOTH ENDS	1-1/2"	1
2	EXPANDABLE SAFETY PLUG (FURNISHED AND INSTALLED BY NATIONAL GRID) ITEM ID 9308764	1-1/2"	1
3	METER BAR ASSEMBLY, AY McDONALD – 1" INLET X1" OUTLET X 1" METER CONNECTIONS, REAR ENTRY WITH BYPASS AND TOP OUTLET, ¼" RECESSED HEX HEAD PLUG, INSULATED UNION OUTLET WITH FLAT WASHER. MODEL AY McDONALD 6312-FFD-1X1X1"	1" X 1" X 1"	1
4	ITEM DELETED	-	-
5	PLUG 1" - MALLEABLE IRON (MUST BE THREADED ON METER BAR INLET AND OUTLET)	1"	2
6	THREADED CAP, MALLEABLE IRON	1-1/2"	1
7	NIPPLE, SCHEDULE 80, API-5L, GRADE B, CARBON STEEL, 1" DIAM. X 2" LONG, MALE THREADS ONE END.	1"	1
8	LOCK – BULLET HIGHFIELD #6 PART # 93180125-WS	-	2
9	THRFEAD PROTECTOR QTY 1 - 1-1/2" FOR HEADER, QTY 1 - 1" FOR METER BAR OUTLET	1" A ND 1-1/2"	2
No.	**ITEM**	**NGG CODE No.**	

BILL OF MATERIAL



ITEM ID 9386062

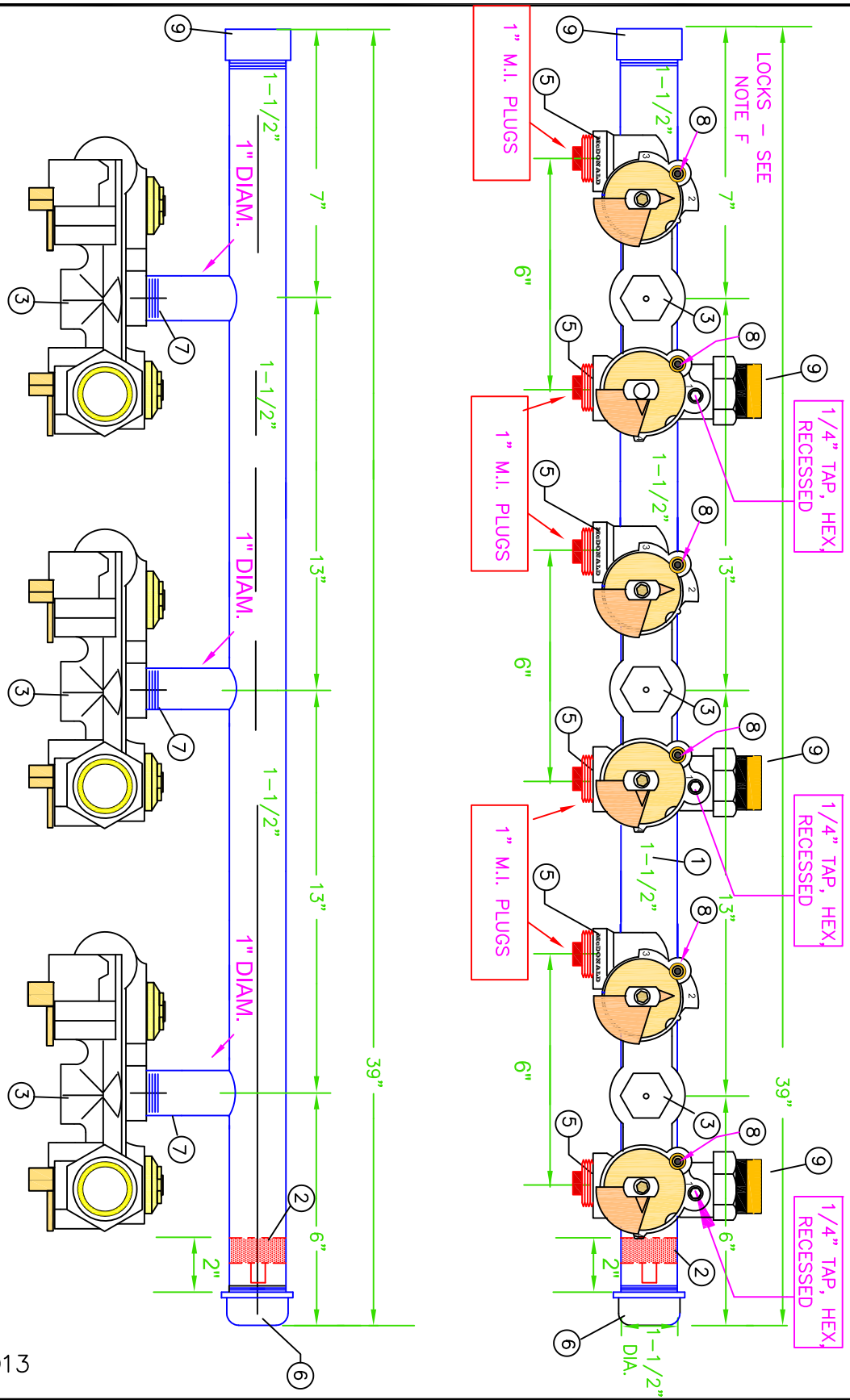
nationalgrid MA

PREFABRICATED DOUBLE 250/425 METER SET WITH REAR ENTRY BYPASS METER BAR - LOW PRESSURE

REVISIONS:
REVISED METER BAR TO 1"X1"X1", MADE APPLICABLE TO CLASS 425 METERS, REMOVED SWIVELS

DATE: 02/26/2010	EFFECTIVE DATE: 08/02/2021
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6624
DRAWN: PAUL GUGLIOTTA	

THE METER BARS SHALL BE SUPPLIED IN THE POSITION AS SHOWN
INLET IN OFF POSITION



ITEM ID 9382013

PREFABRICATED TRIPLE 250/425 METER SET WITH REAR ENTRY BYPASS METER BAR - LOW PRESSURE

nationalgrid MA

REVISIONS:
REVISED METER BAR TO 1X1X1, REMOVED SWIVELS
MADE APPLICABLE TO 425 METERS

DATE: 02/26/2010	EFFECTIVE DATE: 08/02/2021
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6625
DRAWN: PAUL GUGLIOTTA	

NOTES:

A. PRESSURE TEST AT 90 PSIG FOR 15 MINUTES. LEAK TEST METER SETS TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED.
B. 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 ASA#49 GRAY ACRYLIC ENAMEL. MINIMUM 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID PROJECT ENGINEERING.
C. PRIOR TO THE START OF FABRICATION, THE SUPPLIER SHALL SUBMIT TO NATIONAL GRID, WELDER CERTIFICATION DOCUMENTS SATISFACTORY TO NATIONAL GRID FOR EACH OF THE WELDERS EMPLOYED ON THE PROJECT.
D. WELDING SHALL BE IN ACCORDANCE WITH NATIONAL GRID'S WELDING PROCEDURE, 49CFR PART 192 – TRANSPORTATION OF NATURAL GAS AND OTHER GAS BY PIPELINES: MINIMUM SAFETY STANDARDS 220CMR101, DEPARTMENT OF PUBLIC UTILITIES, GENERAL REQUIREMENTS: API 1104 – WELDING OF PIPELINES AND RELATED FACILITIES. OTHER WELDING PROCEDURES MUST BE APPROVED BY NATIONAL GRID PRIOR TO FABRICATION.
E. ALL WELD TESTING SHALL BE DONE IN ACCORDANCE WITH API STANDARD 1104 – WELDING OF PIPELINES AND RELATED FACILITIES.
F. **METER BARS SHALL BE SUPPLIED IN THE POSITIONS AS SHOWN ON PAGE 1 (INLET OFF). BULLET LOCKS SHALL BE INSTALLED ON BOTH SIDES OF METER BAR AND PLASTIC PROTECTOR SHALL BE PLACED ON LOCKS PRIOR TO PAINTING.**

ITEM ID 9382013

ITEM	DESCRIPTION	SIZE	QUANTITY
1	TRIPLE MANIFOLD, SCHEDULE 40, API 5L GRADE B, CARBON STEEL, MALE THREADS BOTH ENDS	1-1/2"	1
2	EXPANDABLE SAFETY PLUG (FURNISHED AND INSTALLED BY NATIONAL GRID) ITEM ID 9308764	1-1/2"	1
3	METER BAR ASSEMBLY, AY McDONALD – 1" INLET X1" OUTLET X 1" METER CONNECTIONS, REAR ENTRY WITH BYPASS AND TOP OUTLET, ¼" RECESSED HEX HEAD PLUG, INSULATED UNION OUTLET WITH FLAT WASHER MODEL AY McDONALD 6312-FFD-1X1X1	1" X 1" X 1"	3
4	ITEM DELETED		
5	MALLEABLE IRON PLUG 1"	1"	6
6	THREADED CAP, MALLEABLE IRON 150#	1-1/2"	1
7	NIPPLE, SCHEDULE 80, API-5L, GRADE B, CARBON STEEL, 1" DIAM. X 2" LONG, MALE THREADS ONE END.	1"	3
8	LOCKS – BULLET #6	-	6
9	THREAD PROTECTOR QTY 1 (1-1/2" FOR MANIFOLD) QTY 3 (1" FOR METER BAR OUTLET)	1" & 1-1/2"	4
No.	**ITEM**	**NGG CODE No.**	

BILL OF MATERIAL

NOTES:

A. PRESSURE TEST AT 90 PSIG FOR 15 MINUTES. LEAK TEST METER SETS TO ENSURE THAT ALL THREADED JOINTS ARE PROPERLY ASSEMBLED.
B. 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 SOLVENTBASED ASA#49 GRAY ACRYLIC ENAMEL. MINIMUM 2-3 MILS, OR EQUIVALENT AS APPROVED BY NATIONAL GRID PROJECT ENGINEERING.
C. PRIOR TO THE START OF FABRICATION, THE SUPPLIER SHALL SUBMIT TO NATIONAL GRID, WELDER CERTIFICATION DOCUMENTS SATISFACTORY TO NATIONAL GRID FOR EACH OF THE WELDERS EMPLOYED ON THE PROJECT.
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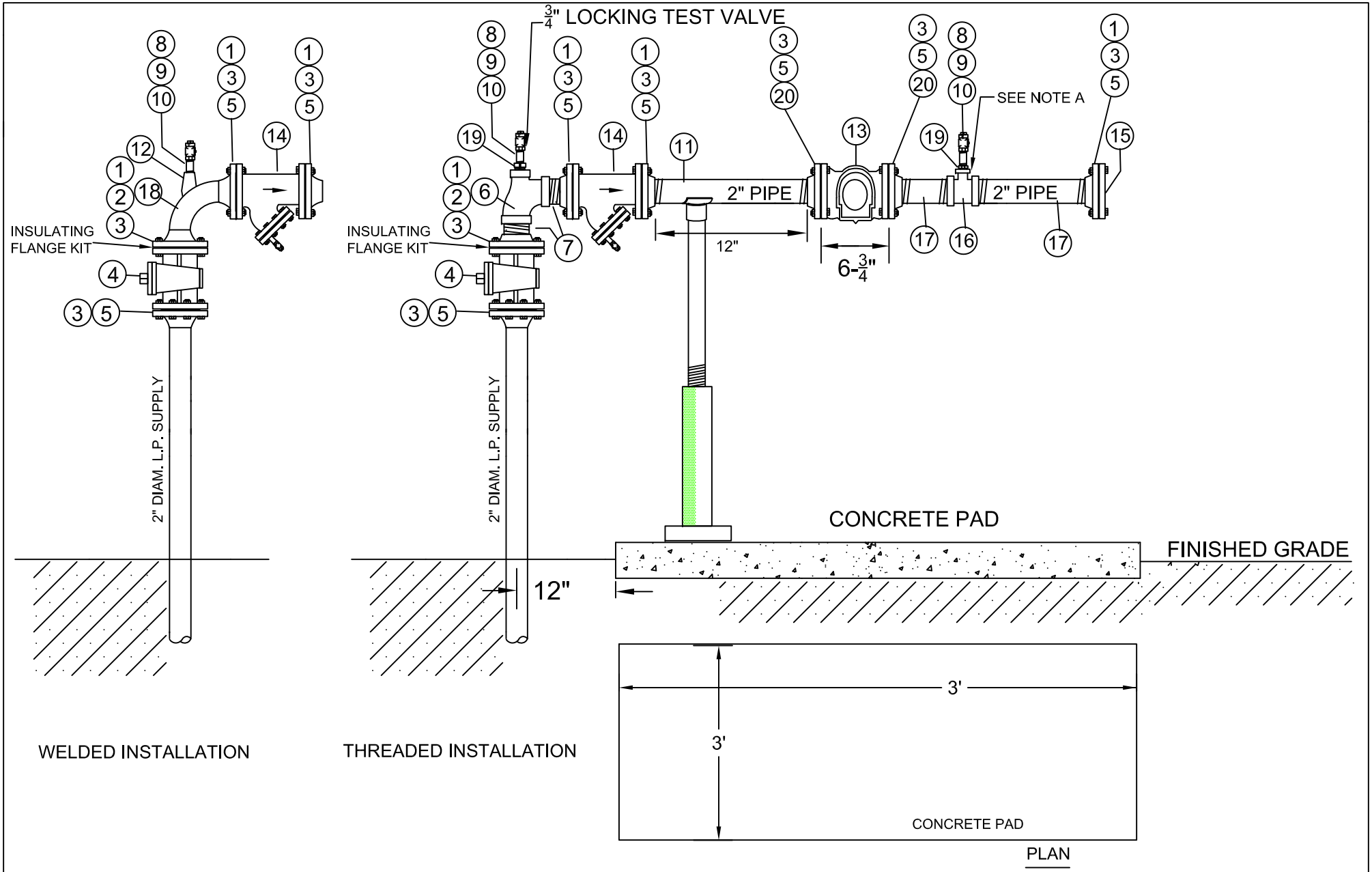
E. ALL WELD TESTING SHALL BE DONE IN ACCORDANCE WITH API STANDARD 1104 – WELDING OF PIPELINES AND RELATED FACILITIES.
F. **METER BARS SHALL BE SUPPLIED IN THE POSITIONS AS SHOWN ON PAGE 1 (INLET OFF). BULLET LOCKS SHALL BE INSTALLED ON BOTH SIDES OF METER BAR AND PLASTIC PROTECTOR SHALL BE PLACED ON LOCKS PRIOR TO PAINTING.**

ITEM ID 9386062

ITEM	DESCRIPTION	SIZE	QUANTITY
1	DOUBLE MANIFOLD, SCHEDULE 40, API 5L GRADE B, CARBON STEEL, MALE THREADS BOTH ENDS	1-1/2"	1
2	EXPANDABLE SAFETY PLUG (FURNISHED AND INSTALLED BY NATIONAL GRID) ITEM ID 9308764	1-1/2"	1
3	METER BAR ASSEMBLY, AY MCDONALD – 1" INLET X1" OUTLET X 1" METER CONNECTIONS, REAR ENTRY WITH BYPASS AND TOP OUTLET, ¼" RECESSED HEX HEAD PLUG, INSULATED UNION OUTLET WITH FLAT WASHER MODEL AY MCDONALD 6312-FFD—1X1X1	1" X 1" X 1"	2
4	ITEM DELETED		
5	PLUG MALLEABLE IRON 1"	1"	4
6	THREADED CAP, MALLEABLE IRON	1-1/2"	1
7	NIPPLE, SCHEDULE 40, API-5L, GRADE B, CARBON STEEL, 1" DIAM. X 2" LONG, MALE THREADS ONE END.	1"	2
8	LOCKS – BULLET HIGHFIELD #6	4	
9	THREAD PROTECTOR QTY 1 FOR 1-1/2" HEADER AND QTY 2 FOR 1" METER BAR OUTLET	1" AND 1-1/2"	3
NO.	**ITEM**	**NGG CODE NO.**	

BILL OF MATERIAL



nationalgrid

MA

8C, 1.5M OR 3M LOW PRESSURE METERING

KEY CHANGES: UPDATED SAP ITEM ID #'S

DATE: 10/31/2007	EFFECTIVE DATE: 06/22/2020
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. **MTRS-6650**
DRAWN: PAUL GUGLIOTTA	

NOTES:

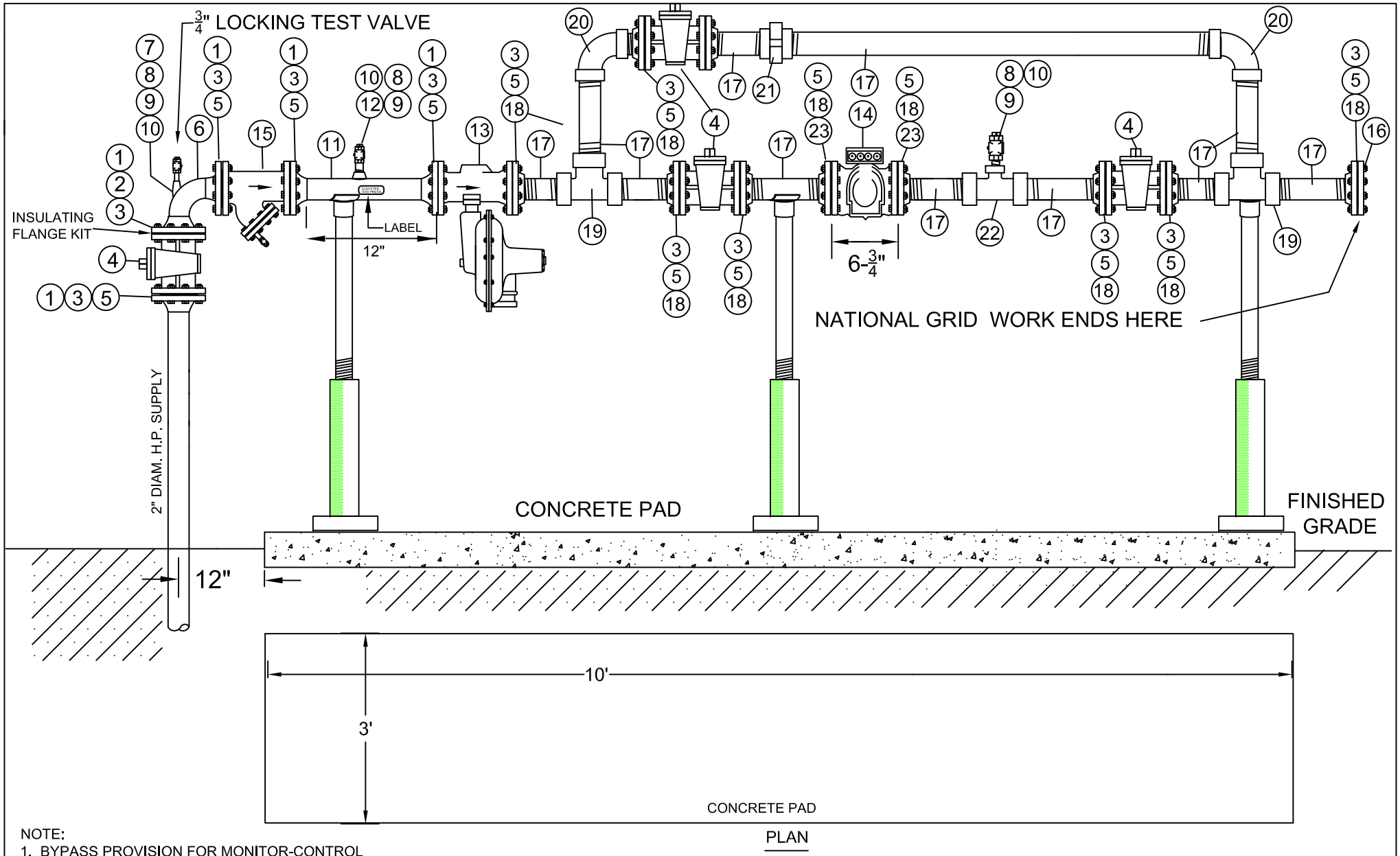
A. FOR ¾" PRESURE TAP USE THREADED TEE OR ¾" THRED-O-LET.
B. ALL LENGTHS / DIMENSIONS OF NIPPLES ARE DETERMINED IN THE FIELD DEPENDING ON FIELD CONDITIONS.

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1 OR	FLANGE 2" 150# THREADED FLAT FACE PER A-105 GR. B	9308663	6	FOR THREADED HEADERS
1A	FLANGE 2" 150# WELD NECK, FLAT FACE PER-1-105 GR. B	9314322	6	FOR WELDED HEADERS
2	INSULATING FLANGED KIT 2" 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8" X 3.5"	9325019	20	
	WITH NUTS or	9325024	40	
	BOLTS STUD 5/8" X 4" LONG – CORROSION RESISTANT W/NUTS	9392186	20	PREFERRED
4	VALVE, 2" PLUG FLANGED END FIG. 143 OR EQ. OR	9341980	1	
	VALVE, 2" BALL FLANGED END BALON.	9306256	1	
5	GASKET 2" RING 150# FLEXITALLIC SIGMA 588	9341161	5	
6	TEE 2" X 1-1/4" X 2" (REDUCING RUN) THREADED	9322580	1	ALT ITEM 18 FOR WELDED HEADERS
7	NIPPLE 2" X 3" STEEL, STD. WALL GRADE B	9306532	2	
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	2	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	2	
10	PLUG ¾" SOLID	9312288	2	
11	NIPPLE 2" X 12" STEEL, STD. WALL 0.154" WALL GR. B	9315870	1	ALT. 2" STEEL PIPE
12	ELBOWLET ¾" X 2" PIPE (FOR WELDED INSTALLATIONS)	9349812	1	FOR WELDED HEADERS
13	METER 8C, 1.5M OR 3M - 2" ROTARY FLANGED ENDS	---	1	
14	STRAINER 2" Y-TYPE FLANGED ENDS	9340158	1	
15	BLIND FLANGE 2" CLASS 150#	9382074	1	ALT. 2" UNION AND PLUG 00303136
16	TEE, 2" X 2 X 1-1/4" THREADED (FOR THR'D HEADERS)	9306334	1	ALT. 2" X 2" X ¾" THR'D TEE 00371507
	OR ¾" THRED-O-LETS FOR WELDED HEADERS	9341652	2	
17	NIPPLE 2" X FIELD LENGTH	---	2	
18	ELBOW 2" WELD END 90 DEGREES, STD. WALL, L.R.	9315522	1	FOR WELDED HEADERS
19	BUSHING 1-1/4" X ¾"	9339863	2	FOR THREADED HEADERS
20	BOLT, HEX HEAD 5/8"X1-1/2"	9325042	8	

SHT. 2 OF 2 **MTRS-6650**

BILL OF MATERIAL 8C – 3M LP MAIN/LP METERING



NOTE:

1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.

2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

ELEVATED GAS PRESS. LABEL

nationalgrid MA

REVISIONS: REVISED USING SAP ITEM ID #'S

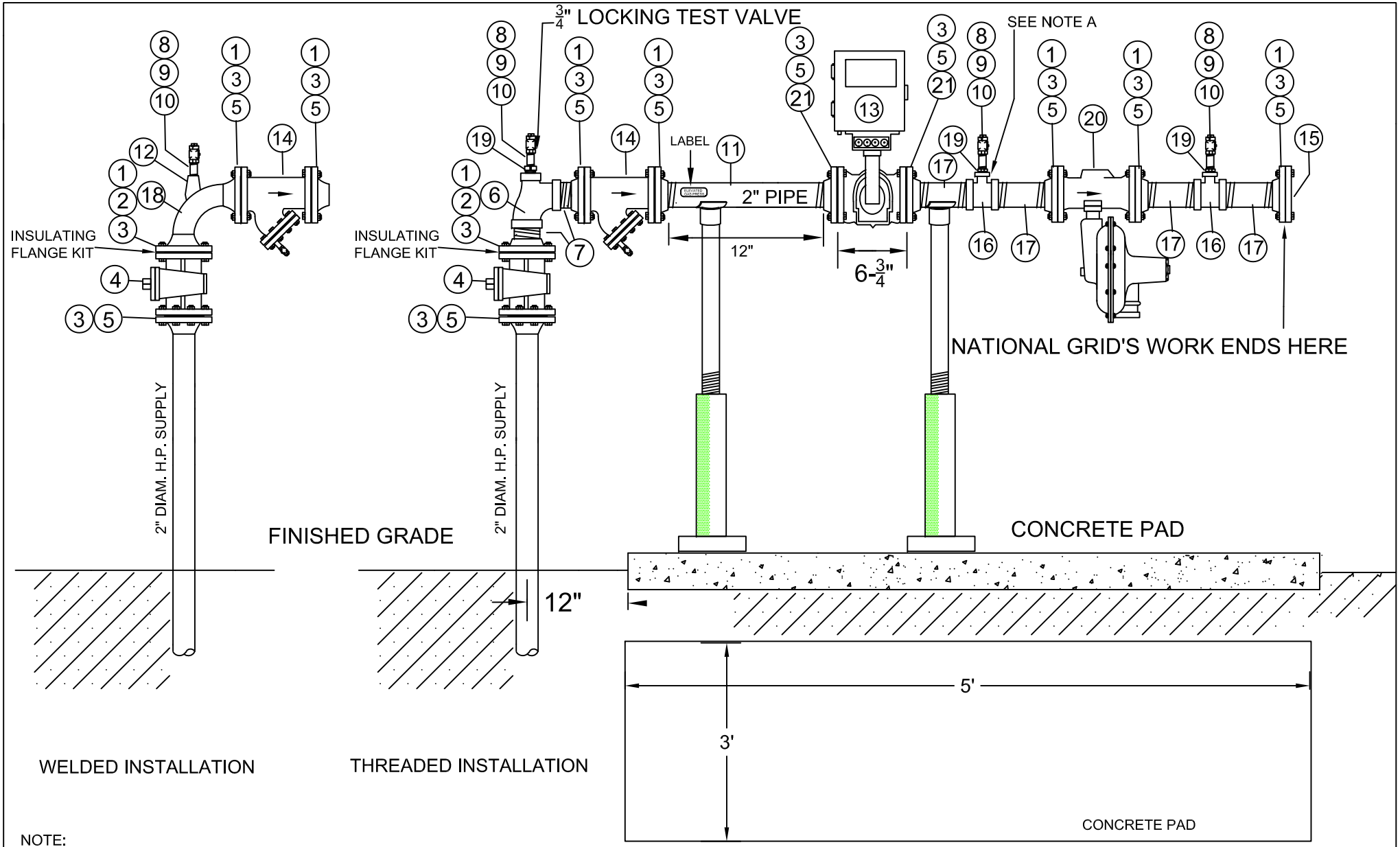
8C, 1.5M, 3M METERING WITH BYPASS

DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6662
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308663	5	
2	INSULATING FLANGED KIT 2” 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8” X 3.5”	9325019	48	
	WITH NUTS OR	9325024	96	
	BOLTS STUD 5/8” X 4” LONG – CORROSION RESISTANT W/2 HEX NUTS	9392186	48	PREFERRED
4	VALVE, 2” PLUG FLANGED END FIG. 143 OR EQ.	9341980	4	
5	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	14	
6	ELBOW, 2” 90 DEG., STEEL, WELD END STD. WALL A-234	9315522	1	
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	3	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾” SOLID	9312288	3	
11	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9312351	6’	
12	THRED-O-LET ¾” X 4” PIPE	9341652	2	
13	REGULATOR 2” FLANGED ENDS	---	1	To be specified by engineering
14	METER 8C, 1.5M OR 3M - 2” ROTARY FLANGED ENDS	---	1	
15	STRAINER 2” Y-TYPE FLANGED ENDS	9340158	1	
16	FLANGE 2” BLIND 150#	9382074	3	
17	NIPPLE 2” x LENGTH AS REQ’D, STD. WALL	---	12	
18	FLANGE 2” THREADED FLAT FACE 125 CLASS	9308663	10	ALTERNATE 2” WELD NECK (ITEM 1)
19	TEE 2” X 2” THREADED	9315942	2	
20	ELBOW 2” THREADED 90 DEGREES	9315416	2	
21	UNION 2”	9315856	1	
22	TEE 2” X 2” X ¾” THREADED (REDUCING BRACCH TEE)	9308466	1	
23	BOLT, HEX HEAD, MACHINE 5/8” X 1-1/2” LONG	9325042	8	

BILL OF MATERIAL 8C-3M HP MAIN LP METERING WITH BYPASS



NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.

2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

ELEVATED GAS PRESS. LABEL

nationalgrid

MA

8C, 1.5M, 3M HIGH PRESSURE METERING

KEY CHANGES: UPDATED ITEM ID #'S

DATE: 10/31/2007	EFFECTIVE DATE: 06/22/2020
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6655
DRAWN: PAUL GUGLIOTTA	

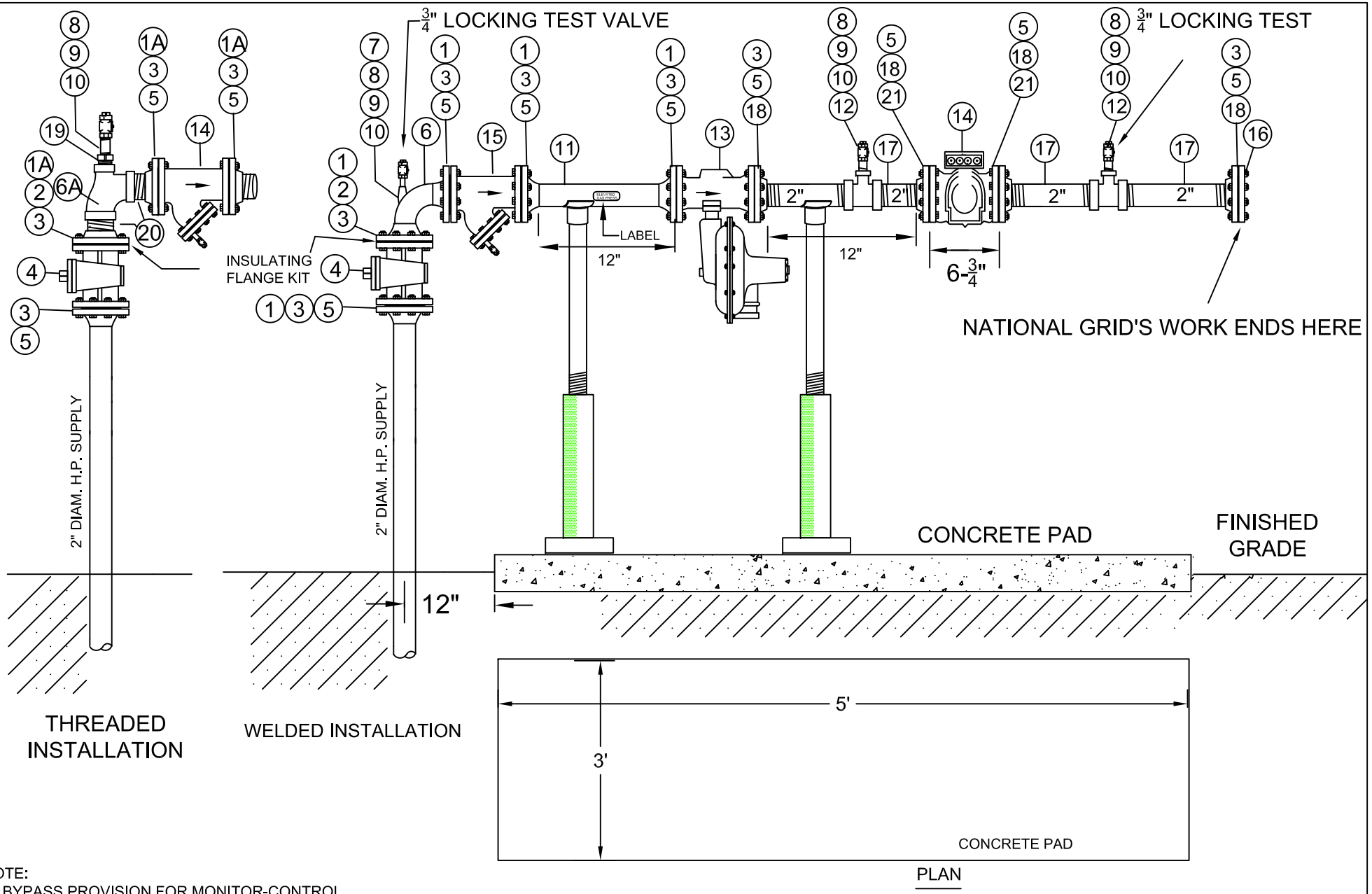
NOTES:

A. FOR ¾" PRESURE TAP USE THREADED TEE OR ¾" THRED-O-LET.
B. ALL LENGTHS / DIMENSIONS OF NIPPLES ARE DETERMINED IN THE FIELD DEPENDING ON FIELD CONDITIONS.
C. WHERE VEHICULAR TRAFFIC MAY CAUSE DAMAGE TO METER SET, INSTALL PROTECTION POST PER MTRS-6060.
D. FOR CLEARANCES FROM METER AND REGULATOR TO BUILDING, SEE 020013-CS.

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1 OR	FLANGE 2" 150# THREADED FLAT FACE PER A-105 GR. B	9308663	8	FOR THREADED HEADERS
1A	FLANGE 2" 150# WELD NECK, FLAT FACE PER-A-105 GR. B	9314322	8	FOR WELDED HEADERS
2	INSULATING FLANGED KIT 2" 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8" X 3.5"	9325019	32	
	WITH NUTS	9325024	56	
	BOLTS STUD 5/8" X 4" LONG – CORROSION RESISTANT	9392186	32	PREFERRED
4	W/2 HEX NUTS			
5	VALVE, 2" PLUG FLANGED END FIG. 143 OR EQ. OR	9341980	1	
	VALVE, 2" BALL FLANGED END BALON	9306256		
	GASKET 2" RING FLEXITALLIC SIGMA 588	9341161	5	
6	TEE 2" X 1-1/4" X 2" (REDUCING RUN) THREADED	9322580	1	ALT ITEM 18 FOR WELDED HEADERS
7	NIPPLE 2" X 3" STEEL, STD. WALL GRADE B	9306532	2	
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	3	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾" SOLID		3	
11	NIPPLE 2" X 12" STEEL, STD. WALL 0.154" WALL GR. B	9315870	1	ALT. 2" STEEL PIPE 9322718
12	ELBOWLET ¾" X 2" PIPE (FOR WELDED INSTALLATIONS)	9349812	1	FOR WELDED HEADERS
13	METER 8C, 1.5M OR 3M - 2" ROTARY FLANGED ENDS	---	1	
14	STRAINER 2" Y-TYPE FLANGED ENDS	9340158	1	
15	BLIND FLANGE 2" CLASS 150#	9382074	1	ALT. 2" UNION AND PLUG 9312173
16	TEE, 2" X 2 X 1-1/4" THREADED (FOR THR'D HEADERS)	9306334	2	ALT. 2" X 2" X ¾" THR'D TEE 9308466
	OR ¾" THRED-0-LET FOR WELDED CONSTRUCTION	9341652	2	
17	NIPPLE 2" X FIELD LENGTH	---	4	
18	ELBOW 2" WELD END 90 DEGREES, STD. WALL, L.R.	9315522	1	FOR WELDED HEADERS
19	BUSHING 1-1/4" X ¾"	9339863	3	FOR THREADED HEADERS
20	REGULATOR 2"	---	1	SPECIFIED BY GAS ENGINEERING
	ITRON B38-R/AMERICAN 1813B 3/8" ORIFICE 60 PSIG MAX	9323054*		*CHANGE ORIFICES FOR HIGHER
	ITRON B38-IMR 3/8" ORIFICE 100 PSIG MAX	9324887*		PRESSURE RATING
	ITRONB34-IMRV 3/8" ORIFICE 100 PSIG MAX	9381875*		
	FISHER CS806-IR ½" ORIFICE 100 PSIG MAX	9386777*		
	FISHER CS800-IQ ½" ORIFICE 60 PSIG MAX	9391005*		
	FISHER CS806-IQ 3/8" ORIFICE 100 PSIG MAX	9393158*		
21	BOLTS, HEX HEAD 5/8" X 1-1/2" LONG	9325042	8	

BILL OF MATERIAL 8C – 3M HP MAIN/HP METERING



NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.

2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

ELEVATED GAS PRESS. LABEL

nationalgrid MA

8C, 1.5M, 3M METERING 2" REGULATOR

KEY CHANGES: UPDATED SAP ITEM ID #'S

DATE: 10/31/2007	EFFECTIVE DATE: 06/22/2020
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6660
DRAWN: PAUL GUGLIOTTA	

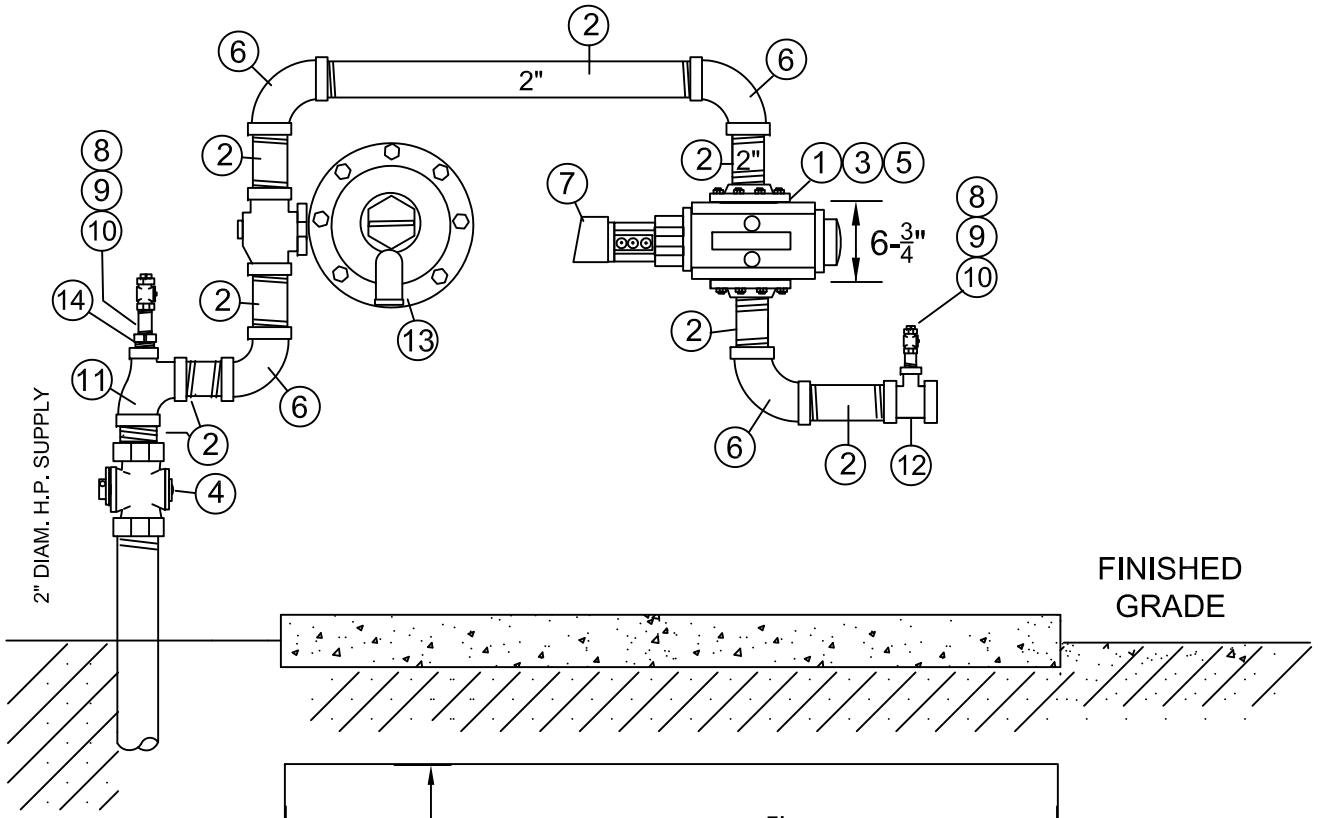
NOTES:

A. FOR ¾" PRESURE TAP USE THREADED TEE OR ¾" THRED-O-LET.
B. ALL LENGTHS / DIMENSIONS OF NIPPLES ARE DETERMINED IN THE FIELD DEPENDING ON FIELD CONDITIONS.
C. WHERE VEHICULAR TRAFFIC MAY CAUSE DAMAGE TO METER SET, INSTALL PROTECTION POST PER MTRS-6060.
D. FOR CLEARANCES FROM METER AND REGULATOR TO BUILDING, SEE 020013-CS.

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 2" 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	5	FOR WELDED HEADERS
2	INSULATING FLANGED KIT 2" 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8" X 3.5"	9325019	36	
	WITH NUTS OR	9325024	72	
	BOLTS STUD 5/8" X 4" LONG – CORROSION RESISTANT	9392196	20	PREFERRED
3	W/NUTS			
4	VALVE, 2" PLUG FLANGED END FIG. 143 OR EQ.	9341980	1	
5	VALVE, 2" BALL FLANGED END BALON	9306256		
	GASKET 2" RING 150# KLINGER C-4401	9341161	8	
6	ELBOW, 2" 90 DEG., STEEL, WELD END STD. WALL A-234	9315522	1	FOR WELDED HEADERS
6A	TEE 2"X1-1/4"X 2" (REDUCING RUN) THREADED	9322580	1	FOR THREADED HEADERS
7	ELBOW-LET ¾" FOR 4" ELBOW PER A-105 GR. B	9349812	1	FOR WELDED HEADERS
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	3	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾" SOLID	9312288	3	
11	PIPE 2" STEEL, STD. WALL 0.154" WALL BARE PER A-53	9322718	6'	ALT USE 2" THREADED NIPPLES
12	TEE 2" X 2" X ¾" THREADED	9308466	2	ALT. USE THRED-O-LET ¾" X 4" PIPE
13	REGULATOR 2" FLANGED ENDS	---	1	TO BE SPECIFIED BY GAS ENGINEERING
	ITRON B38-R/AMERICAN 1813B 3/8" ORIFICE 60 PSIG MAX	9323054*		*CHANGE ORIFICES FOR HIGHER
	ITRON B38-IMR 3/8" ORIFICE 100 PSIG MAX	9324887*		PRESSURE RATING
	ITRONB34-IMRV 3/8" ORIFICE 100 PSIG MAX	9381875*		
	FISHER CS806-IR ½" ORIFICE 100 PSIG MAX	9386777*		
	FISHER CS800-IQ ½" ORIFICE 60 PSIG MAX	9391005*		
	FISHER CS806-IQ 3/8" ORIFICE 100 PSIG MAX	9393158*		
14	METER 8C, 1.5M OR 3M - 2" ROTARY FLANGED ENDS	---	1	
15	STRAINER 2" Y-TYPE FLANGED ENDS	9340158	1	
16	FLANGE 2" BLIND 150#	9382074	1	
17	NIPPLE 2" x 12" STEEL A-53 GRADE B STD. WALL	9315870	2	OR LENGTH DETERMINED IN FIELD
18	FLANGE 2" THREADED FLAT FACE 125 CLASS	9340948	4	ALTERNATE 2" WELD NECK (ITEM 1), QTY 9 FOR ALL THREADED HEADERS
19	BUSHING 1-1/4" X ¾"	9339863	1	FOR THREADED HEADERS
20	NIPPLE 2" X 3" STEEL, STD. WALL, GRADE B	9308663	2	FORTHREADED HEADERS
21	BOLT, HEX HEAD 5/8" X 1-1/2" LONG	9325042	8	

BILL OF MATERIAL 8C-3M HP MAIN LP METERING



NOTE:

1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.

2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

3. ROTARY METERS IN THE VERTICAL POSITION TO HAVE THE FLOW GOING DOWN.

ELEVATED GAS PRESS. LABEL

nationalgrid

MA

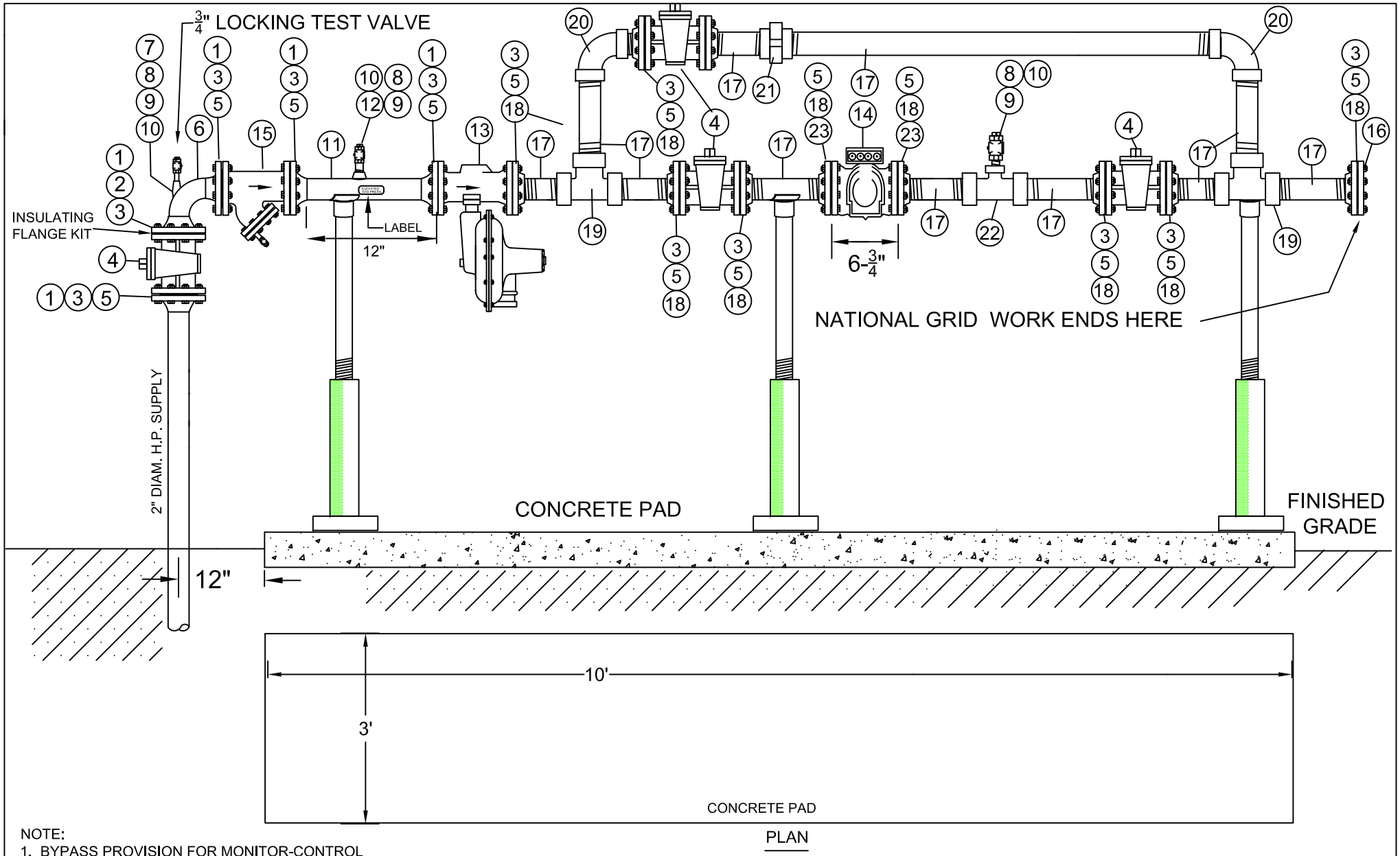
8C, 1.5M, 3M VERTICAL METER WITH REGULATOR

REVISIONS:	REVISED USING SAP ITEM ID #'S	
	DATE: 11/15/2007	EFFECTIVE DATE: 09/15/2013
	DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6661
	DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 2” THREADED FLAT FACE 125 CLASS	9308663	2	
2	NIPPLE 2” X LENGTH AS REQ’ STEEL, STD. WALL, GR. B	---	8	
3	HEX HEAD BLOT – 5/8” X 11 X 1-1/2” LONG	9325042	8	
4	VALVE, 2” PLUG FLANGED END FIG. 143 OR THREADED.	9341980	1	2” LOCKWING VALVE 9322524
5	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	2	
6	ELBOW, 2” 90 DEG., STEEL, THREADED SCREWED	9315416	4	
7	METER 8C, 1.5M OR 3M - 2” ROTARY FLANGED ENDS	---	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	1	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	2	
10	PLUG ¾” SOLID	9312288	2	
11	TEE 2”X1-1/4”X 2” (REDUCING RUN) THREADED	9322580	6’	
12	TEE 2” X 2” X ¾” THREADED	9308466	1	
13	REGULATOR 2” THREADED ENDS	---	1	
14	BUSHING 1-1/4” X ¾”	9339863	1	

BILL OF MATERIAL 8C-3M HP MAIN LP METERING



NOTE:

1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.

2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

ELEVATED GAS PRESS. LABEL

nationalgrid MA

REVISIONS: REVISED USING SAP ITEM ID #'S

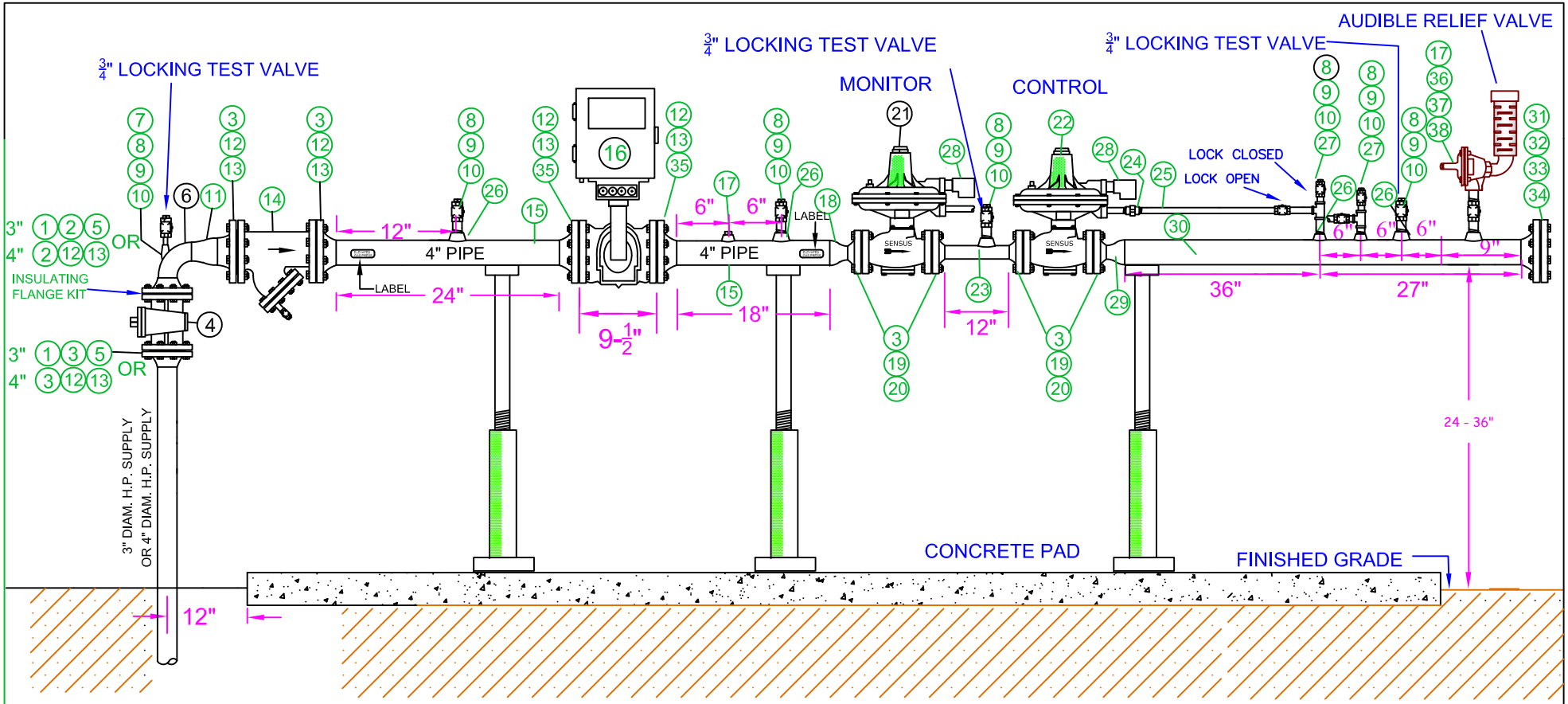
8C, 1.5M, 3M METERING WITH BYPASS

DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6662
DRAWN: PAUL GUGLIOTTA	

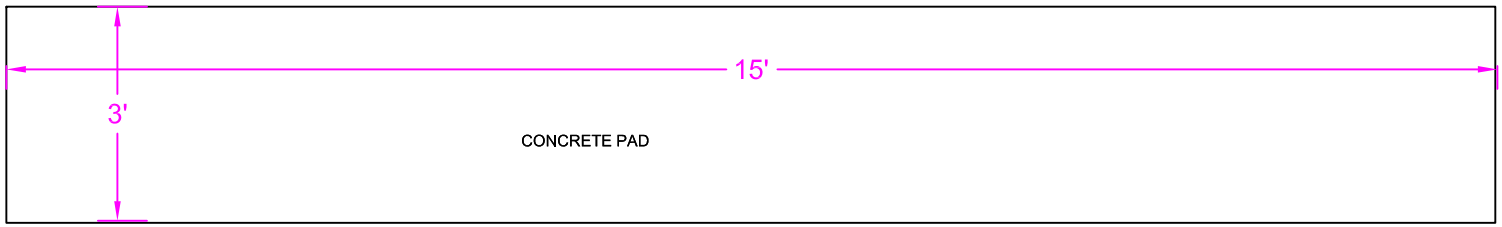
BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308663	5	
2	INSULATING FLANGED KIT 2” 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8” X 3.5”	9325019	48	
	WITH NUTS OR	9325024	96	
	BOLTS STUD 5/8” X 4” LONG – CORROSION RESISTANT W/2 HEX NUTS	9392186	48	PREFERRED
4	VALVE, 2” PLUG FLANGED END FIG. 143 OR EQ.	9341980	4	
5	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	14	
6	ELBOW, 2” 90 DEG., STEEL, WELD END STD. WALL A-234	9315522	1	
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	3	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾” SOLID	9312288	3	
11	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9312351	6’	
12	THRED-O-LET ¾” X 4” PIPE	9341652	2	
13	REGULATOR 2” FLANGED ENDS	---	1	To be specified by engineering
14	METER 8C, 1.5M OR 3M - 2” ROTARY FLANGED ENDS	---	1	
15	STRAINER 2” Y-TYPE FLANGED ENDS	9340158	1	
16	FLANGE 2” BLIND 150#	9382074	3	
17	NIPPLE 2” x LENGTH AS REQ’D, STD. WALL	---	12	
18	FLANGE 2” THREADED FLAT FACE 125 CLASS	9308663	10	ALTERNATE 2” WELD NECK (ITEM 1)
19	TEE 2” X 2” THREADED	9315942	2	
20	ELBOW 2” THREADED 90 DEGREES	9315416	2	
21	UNION 2”	9315856	1	
22	TEE 2” X 2” X ¾” THREADED (REDUCING BRACCH TEE)	9308466	1	
23	BOLT, HEX HEAD, MACHINE 5/8” X 1-1/2” LONG	9325042	8	

BILL OF MATERIAL 8C-3M HP MAIN LP METERING WITH BYPASS



ELEVATION



PLAN

NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.
2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.
3. CONTROL LINES SHALL BE CONNECTED TO PIPING A MINIMUM OF 8 PIPE DIAMETERS FROM REDUCERS, ELBOWS AND VALVES.

ELEVATED GAS PRESS. LABEL

nationalgrid MA

11M / 16M ROTARY METER W/MONITOR CONTROL 2" REGULATORS

REVISIONS: ADDED RELIEF VALVE

DATE: 10/31/2007
DESIGN: PAUL GUGLIOTTA
DRAWN: PAUL GUGLIOTTA

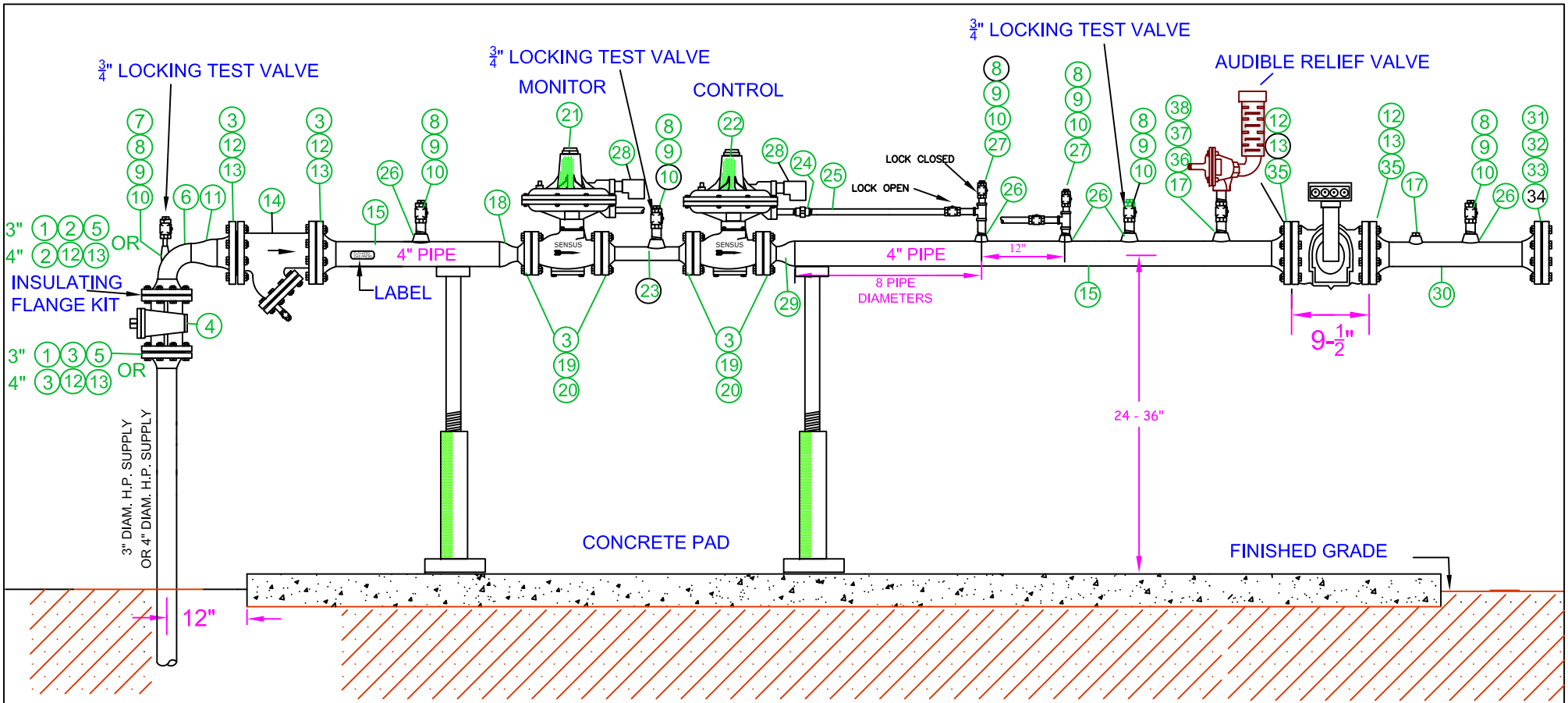
EFFECTIVE DATE: 12/15/2022
STD. DWG. NO. MTRS-6690

BILL OF MATERIAL

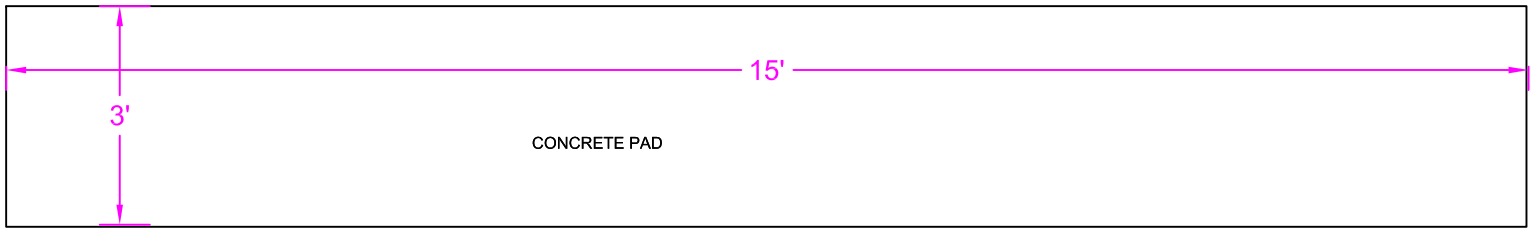
ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 3” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314431	2	
2	INSULATING FLANGED KIT 3” 150# CLASS OR	9340959	1	FOR 3” SERVICE
	INSULATING FLANGED KIT 4” 150# CLASS	9341024	1	FOR 4” SERVICE
3	BOLTS STUD – 5/8” X 3.5” WITH NUTS CORROSION RESISTANT	9392186	40	
4	VALVE, 3” PLUG FLANGED END FIG. 143 OR EQ. OR	9341981	1	FOR 3” SERVICE
	VALVE, 4” PLUG FLANGED END FIG. 143 OR EQ	9382541	1	FOR 4” SERVICE
	VALVE, 3” BALL FLANGED ENDS - BALON	9306255		
	VALVE, 4” BALL FLANGED ENDS - BALON	9306262		
5	GASKET 3” RING FLEXITALLIC SIGMA 588	9341162	2	
6	ELBOW, 3” 90 DEG., STEEL, WELD END STD. WALL A-234 OR	9315471	1	FOR 3” SERVICE
	ELBOW, 4” 90 DEG., STEEL, WELD END STD. WALL A-234	9315385	1	FOR 4” SERVICE
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	9	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9340721	9	
10	PLUG ¾” SOLID	9312288	8	
11	REDUCER 4”X3” CONC, STEEL, WELD END PER A-234 WPB	9315488	1	NOT REQUIRED FOR 4”
12	FLANGE 4” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314430	4	SERVICE
13	GASKET 4” FULL FACE 150# FLEXITALLIC SIGMA 588	9341159	4	QTY 5 FOR 4” SERVICE
14	STRAINER, 4” FLANGED ENDS	9340157	1	
15	PIPE 4” STEEL STANDARD WALL BARE, 0.237” WALL	9340906	2	PER ASTM A-53
16	METER 11M/16M/23M232 ROTARY METER 4” FLANGED ENDS	METER OPS	1	**23M232 IS IN LINE METER**
17	THRED-O-LET 1” X 4” PIPE PER A-105	9342081	2	
18	REDUCER 4”X2” CONC, STEEL, WELD END PER A-234 WPB	9342652	1	
19	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	1	
20	GASKET 4” RING 150# FLEXITALLIC SIGMA 588	9341161	4	
21	REGULATOR 2” FLANGED ENDS SENSUS 121 OR	9323060	1	
	REGULATOR FIORENTINI 2” NORVAL	9394712	1	USE MONITOR KIT 9394713
22	REGULATOR 2” FLANGED ENDS SENSUS 121	9323060	1	FOR THE MONITOR
23	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	3’	REGULATOR
24	UNION ¾”	9307642	2	
25	PIPE ¾” SCH. 40 BARE PER A-53	9322720	6’	
26	THRED-O-LET ¾” X 4” PIPE	9341652	7	
27	TEE - ¾” THREADED	9315887	2	
28	1” VENT SCREENED	9315859	2	.
29	REDUCER WELD END 2” X CUST. HOUSE LINE SIZE	-	1	
30	PIPE CUSTOMER HOUSE LINE SIZE	-	A/R	
31	FLANGE CUSTOMER HOUSE LINE SIZE	-	1	
32	GASKET – CUSTOMER HOUSE LINE SIZE	-	1	
33	BOLTS – DETERMINED BY CUSTOMER HOUSE LINE SIZE	-	8	
34	FLANGE BLIND - CUSTOMER HOUSE LINE SIZE	-	1	
35	BOLT MACHINE HEX HEAD 5/8” X 1-3/4” LONG - STAINLESS	9340789	16	FOR METER
36	NIPPLE 1” X 4” LONG	9315973	2	
37	VALVE 1” LOCKWING – LOCKED OPEN	9312256	1	
38	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393355	1	10-18” W.C. SPRING RANGE
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393264	1	10-20” W.C. SPRING RANGE
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393263	1	12-40” W.C. SPRING RANGE
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H	9358319	1	1-4.5 PSIG SPRING RANGE

NOTE: 4” X 3” REDUCING FLANGES ARE AVAILABLE
4” FLANGE X 3” THREADED ITEM ID 9393259

BILL OF MATERIAL FOR 11M / 16M METER



ELEVATION



PLAN

NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.
2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.
3. CONTROL LINES SHALL BE CONNECTED TO PIPING A MINIMUM OF 8 PIPE DIAMETERS FROM REDUCERS, ELBOWS AND VALVES.

ELEVATED GAS PRESS.
LABEL

nationalgrid
MA

11M / 16M / 23M232 METERING W/MONITOR CONTROL 2" REGULATORS

REVISIONS: ADDED RELIEF VALVE WITH WHISTLE

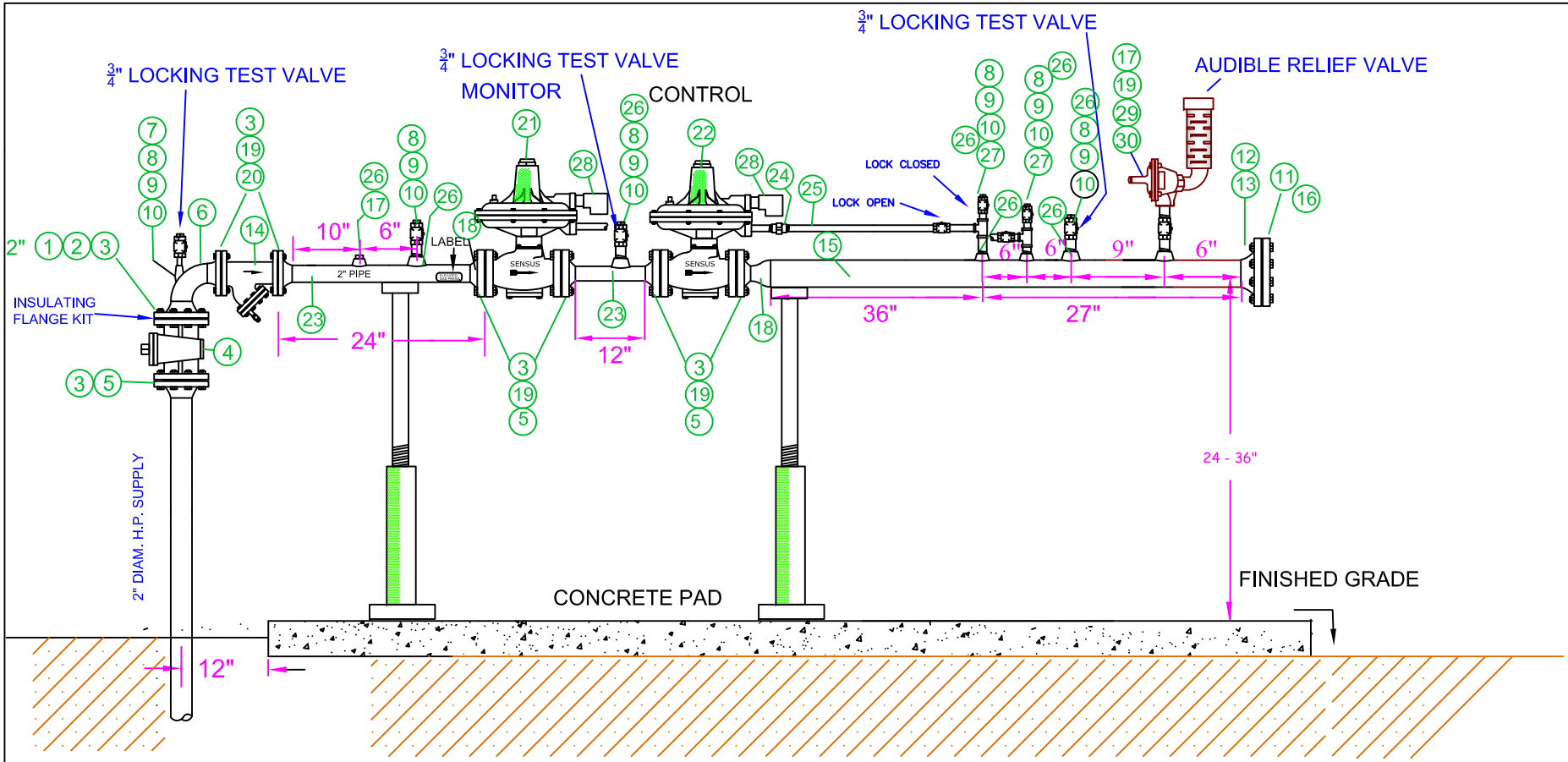
DATE: 10/31/2007	EFFECTIVE DATE: 12/15/2022
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6691
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

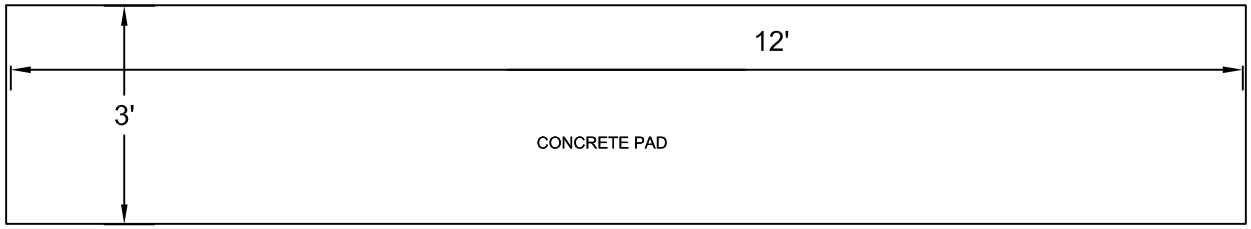
ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 3” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314431	2	
2	INSULATING FLANGED KIT 3” 150# CLASS OR	9340959	1	FOR 3” SERVICE
	INSULATING FLANGED KIT 4” 150# CLASS	9341024	1	FOR 4” SERVICE
3	BOLTS STUD – 5/8” X 3.5” WITH NUTS CORROSION RESISTANT	9392186	40	
4	VALVE, 3” PLUG FLANGED END FIG. 143 OR EQ. OR	9341981	1	FOR 3” SERVICE
	VALVE, 4” PLUG FLANGED END FIG. 143 OR EQ	9382541	1	FOR 4” SERVICE
	VALVE, 3” BALL FLANGED ENDS - BALON	9306255		
	VALVE, 4” BALL FLANGED ENDS - BALON	9306262		
5	GASKET 3” RING FLEXITALLIC SIGMA 588	9341162	2	
6	ELBOW, 3” 90 DEG., STEEL, WELD END STD. WALL A-234 OR	9315471	1	FOR 3” SERVICE
	ELBOW, 4” 90 DEG., STEEL, WELD END STD. WALL A-234	9315385	1	FOR 4” SERVICE
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	9	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9340721	9	
10	PLUG ¾” SOLID	9312288	8	
11	REDUCER 4”X3” CONC, STEEL, WELD END PER A-234 WPB	9315488	1	NOT REQUIRED FOR 4”
12	FLANGE 4” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314430	4	SERVICE
13	GASKET 4” FULL FACE 150# FLEXITALLIC SIGMA 588	9341159	4	QTY 5 FOR 4” SERVICE
14	STRAINER, 4” FLANGED ENDS	9340157	1	
15	PIPE 4” STEEL STANDARD WALL BARE, 0.237” WALL	9340906	2	PER ASTM A-53
16	METER 11M/16M/23M232 ROTARY METER 4” FLANGED ENDS	METER OPS	1	**23M232 IS IN LINE METER**
17	THRED-O-LET 1” X 4” PIPE PER A-105	9342081	2	
18	REDUCER 4”X2” CONC, STEEL, WELD END PER A-234 WPB	9342652	2	
19	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	1	
20	GASKET 4” RING 150# FLEXITALLIC SIGMA 588	9341161	4	
21	REGULATOR 2” FLANGED ENDS SENSUS 121 OR	9323060	1	
	REGULATOR FIORENTINI 2” NORVAL	9394712	1	USE MONITOR KIT 9394713
22	REGULATOR 2” FLANGED ENDS SENSUS 121	9323060	1	FOR THE MONITOR
23	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	3’	REGULATOR
24	UNION ¾”	9307642	1	
25	PIPE ¾” SCH. 40 BARE PER A-53	9322720	4	
26	THRED-O-LET ¾” X 4” PIPE	9341652	7	
27	TEE - ¾” THREADED	9315887	2	
28	1” VENT SCREENED	9315859	2	.
29	REDUCER WELD END 2” X CUST. HOUSE LINE SIZE	-	1	
30	PIPE CUSTOMER HOUSE LINE SIZE	-	A/R	
31	FLANGE CUSTOMER HOUSE LINE SIZE	-	1	
32	GASKET – CUSTOMER HOUSE LINE SIZE	-	1	
33	BOLTS – DETERMINED BY CUSTOMER HOUSE LINE SIZE	-	8	
34	FLANGE BLIND - CUSTOMER HOUSE LINE SIZE	-	1	
35	BOLT MACHINE HEX HEAD 5/8” X 1-3/4” LONG - STAINLESS	9340789	16	FOR METER
36	NIPPLE 1” X 4” LONG	9315973	2	
37	VALVE 1” LOCKWING – LOCKED OPEN	9312256	1	
38	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393355	1	10-18” W.C. SPRING RANGE
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393264	1	10-20” W.C. SPRING RANGE
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393263	1	12-40” W.C. SPRING RANGE
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H	9358319	1	1-4.5 PSIG SPRING RANGE

NOTE: 4” X 3” REDUCING FLANGES ARE AVAILABLE
4” FLANGE X 3” THREADED ITEM ID 9393259

BILL OF MATERIAL FOR 11M / 16M METER



ELEVATION



PLAN

NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.
2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.
3. CONTROL LINES SHALL BE CONNECTED TO PIPING A MINIMUM OF 8 PIPE DIAMETERS FROM REDUCERS, ELBOWS AND VALVES.

ELEVATED GAS PRESS. LABEL

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MONITOR CONTROL SET UP
2" SENSUS 121 REGULATORS
OR FIORENTINI NORVAL REGULATORS
METERS TO BE SPECIFIED PER PROJECT

REVISIONS: ADDED RELIEF VALVE

DATE: 07/15/2020
DESIGN: PAUL GUGLIOTTA
DRAWN: PAUL GUGLIOTTA

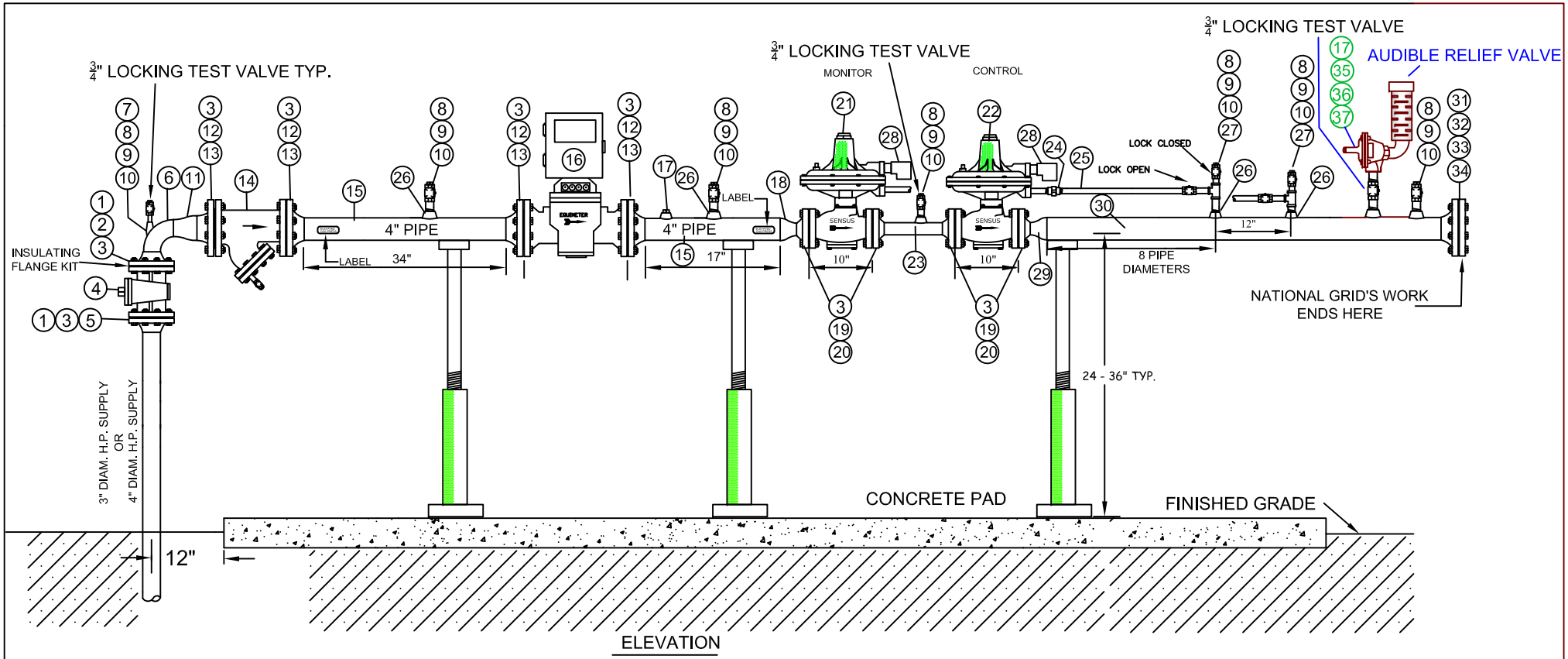
EFFECTIVE DATE: 12/15/2022
STD. DWG. NO. **MTRS-6692**

1. FOR METER PROTECTION REFER TO MTRS-6060.
2. FOR CLEARANCE TO BUILDING OPENINGS, REFER TO 0200130-CS

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 2" 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	7	
2	INSULATING FLANGED KIT 2" 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8" X 3.5"	9325019	32	
	WITH NUTS	9328559	64	
	STUD BOLT – 5/8" X 4" W/2 NUTS ANITI-CORROSION	9392186	32	
4	VALVE, 2" PLUG FLANGED END FIG. 143 OR EQ. OR	9341980	1	
	VALVE, 2" BALL FLANGED END BALON 2R-FS12-FF	9306256	1	
5	GASKET 2" RING TYPE 150# FLEXITALLIC SIGMA 588	9341161	7	
6	ELBOW, 2" 90 DEG., STEEL, WELD END STD. WALL A-234	9315522	1	
7	ELBOW-LET ¾" FOR 4" ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾" X 4.5" LONG PER A-53	9340721	10	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	10	
10	PLUG ¾" SOLID	9312288	10	
11	FLANGE- BLIND 4" – CLASS 150	9306252	-	-
12	FLANGE 4" 150# WELD NECK FLAT FACE PER A-105 GR. B	9314430	4	
13	GASKET 4" FULL FACE 150# FLEXITALLIC SIGMA 588	9341159	4	
14	STRAINER, 2" FLANGED ENDS	9340158	1	
15	PIPE 4" STEEL STANDARD WALL BARE, 0.237" WALL	9340906	2	PER ASTM A-53
16	BOLTS ¾" X 5" STUD WITH 2 HEX NUTS CORROSION RESISTANT	9393185	8	
17	THRED-O-LET 1" X 4" PIPE PER A-105	9342081	2	
18	REDUCER 4"X2" CONC, STEEL, WELD END PER A-234 WPB	9315713	2	
19	NIPPLE 1" X 4" STEEL THREADED	9315973	2	
20	GASKET 4" FULL FACE 150# FLEXITALLIC SIGMA 588	9341159	4	
21	REGULATOR 2" FLANGED ENDS SENSUS 121	9323060	1	-
22	REGULATOR 2" FLANGED ENDS SENSUS 121 OR	9323060	1	-
	REGULATOR FIORENTINI 2" NORVAL	9394712	2	USE MONITOR KIT 9394713 FOR THE
23	PIPE 2" STEEL, STD. WALL 0.154" WALL BARE PER A-53	9322718	8'	MONITOR REGULATOR
24	UNION ¾"	9307642	2	
25	PIPE ¾" SCH. 40 BARE PER A-53	9322720	4	
26	THRED-O-LET ¾" X 4" PIPE	9341652	8	-
27	TEE - ¾" THREADED	9315887	2	-
28	1" VENT SCREENED	9315859	2	-
29	VALVE 1" LOCKWING – LOCKED OPEN	9312256	1	-
30	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393355	1	10-18" W.C. SPRING RANGE
-	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393264	1	10-20" W.C. SPRING RANGE
-	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393263	1	12-40" W.C. SPRING RANGE
-	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H	9358319	1	1- 4.5 PSIG SPRING RANGE

BILL OF MATERIAL FOR 11M / 16M METER



NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.
2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.
3. CONTROL LINES SHALL BE CONNECTED TO PIPING A MINIMUM OF 8 PIPE DIAMETERS FROM REDUCERS, ELBOWS AND VALVES.

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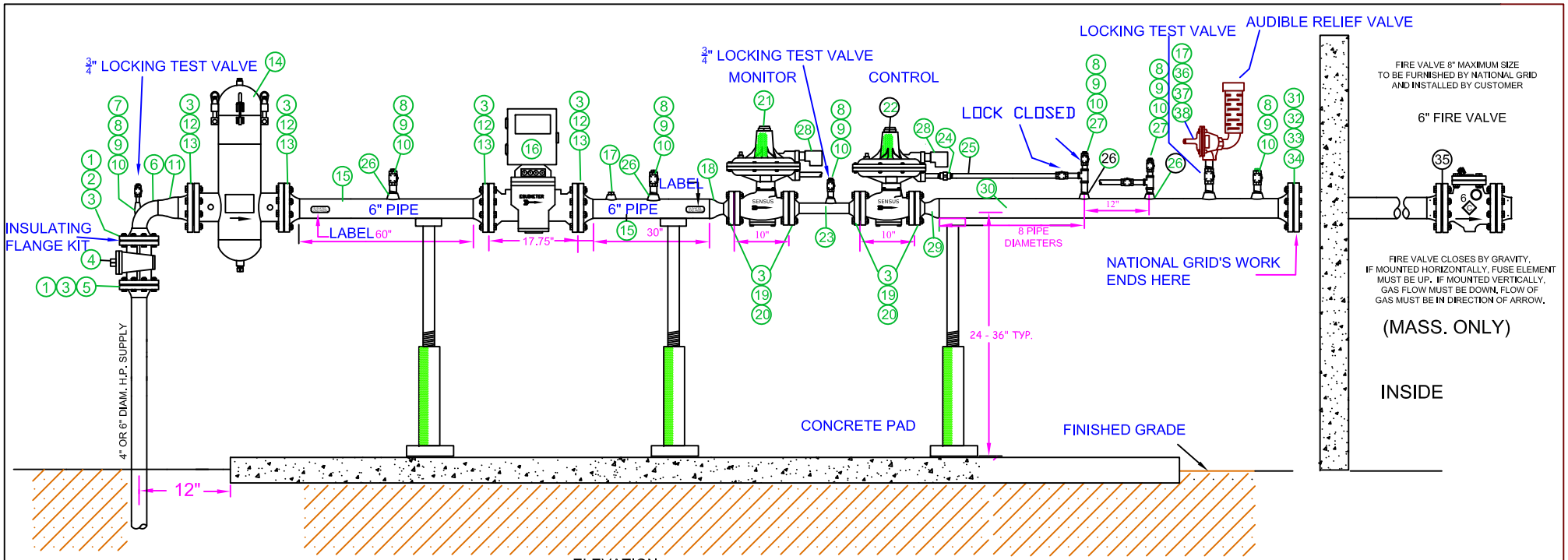
4 INCH TURBO METER W/MONITOR CONTROL 2" REGULATORS

REVISIONS: REVISED added relief valve with whistle	DATE: 10/31/2007	EFFECTIVE DATE: 12/15/2022
	DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6695
	DRAWN: PAUL GUGLIOTTA	

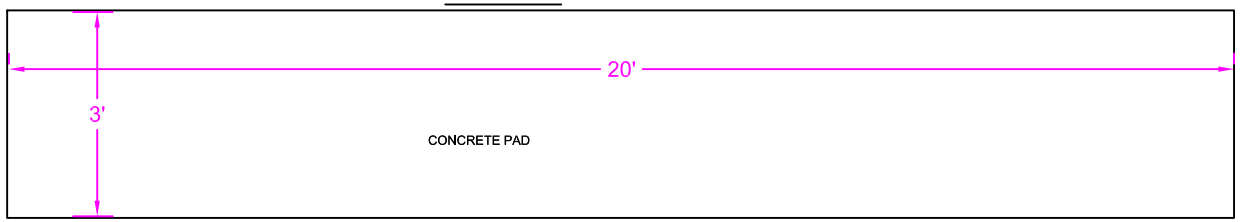
BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1	FLANGE 3” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314431	2	FOR 3” SERVICE
2	INSULATING FLANGED KIT 3” 150# CLASS	9340959	1	FOR 3” SERVICE
	INSULATING FLANGED KIT 3” 150# CLASS	9341024	1	FOR 4” SERVICE
3	BOLTS – STUD – 5/8” X 3.5” LONG WITH 2 NUTS CORROSION	9392186	40	
	RESISTANT (PREFERRED) OR	-	-	
4	BOLTS MACHINE – 5/8” X 3.5”	9325019	40	FOR 3” SERVICE
	WITH NUTS	9325024	80	FOR 4” SERVICE
5	VALVE, 3” PLUG FLANGED END FIG. 143 OR EQ. OR	9341981	1	
	VALVE, 3” BALL VALVE BALON FLANGED END FIG. 143 OR EQ	9306255	1	
	GASKET 3” RING FLEXITALLIC SIGMA 588	9341162	2	
6	ELBOW, 3” 90 DEG., STEEL, WELD END STD. WALL A-234 OR	9315471	1	FOR 3” SERVICE
	ELBOW, 4” 90 DEG., STEEL, WELD END STD. WALL A-234	9315385	1	FOR 4” SERVICE
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	7	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9340721	7	
10	PLUG ¾” SOLID	9312288	5	
11	REDUCER 4”X3” CONC, STEEL, WELD END PER A-234 WPB	9315488	1	NOT REQUIRED FOR 4” SERVICE
12	FLANGE 4” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314430	4	QTY 5 FOR 4” SERVICE
13	GASKET 4” FULL FACE 150# FLEXITALLIC SIGMA 588	9341159	4	
14	STRAINER, 4” FLANGED ENDS	9340157	1	OR 4” FILTER
15	PIPE 4” STEEL STANDARD WALL BARE, 0.237” WALL	9340906	2	PER ASTM A-53
16	METER 4” TURBINE METER FLANGED ENDS	METER OPS	1	
17	THRED-O-LET 1” X 4” PIPE PER A-105	9342081	2	
18	REDUCER 4”X2” CONC, STEEL, WELD END PER A-234 WPB	9342652	2	
19	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	1	
20	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	4	
21	REGULATOR 2” FLANGED ENDS SENSUS 121	9323060	1	
22	REGULATOR 2” FLANGED ENDS SENSUS 121OR	9323060	1	
	REGULATOR FIORENTINI 2” NORVAL	9394712	2	USE MONITOR KIT 9394713
23	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	3’	FOR THE MONITOR REGULATOR
24	UNION ¾”	9307642	1	
25	PIPE ¾” SCH. 40 BARE PER A-53	9322720	4	
26	THRED-O-LET ¾” X 4” PIPE	9341652	4	
27	TEE - ¾” THREADED	9315887	2	
28	1” VENT SCREENED	9315759	2	.
29	REDUCER 2” X CUSTOMER HOUSE LINE SIZE	-	1	
30	PIPE, STEEL CUSTOMER HOUSE LINE SIZE	-	A/R	
31	FLANGE, WELD NECK – HOUSE LINE SIZE	-	1	
32	GASKET HOUSE LINE SIZE	-	1	
33	BOLTS – DETERMINED BY FLANGE SIZE	-	8	
34	BLIND FLANGE – HOUSE LINE SIZE	-	1	
35	NIPPLE 1” X 4” LONG	9315973	2	
36	VALVE 1” LOCKWING – LOCKED OPEN	9312256	1	
37	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393355	1	
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393264		
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393263		
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H	9358319		

BILL OF MATERIAL FOR 4” TURBINE METER



ELEVATION



PLAN

NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.
2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.
3. CONTROL LINES SHALL BE CONNECTED TO PIPING A MINIMUM OF 8 PIPE DIAMETERS FROM REDUCERS, ELBOWS AND VALVES.

ELEVATED GAS PRESS. LABEL

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REVISIONS: REVISED USING SAP ITEM ID #'S

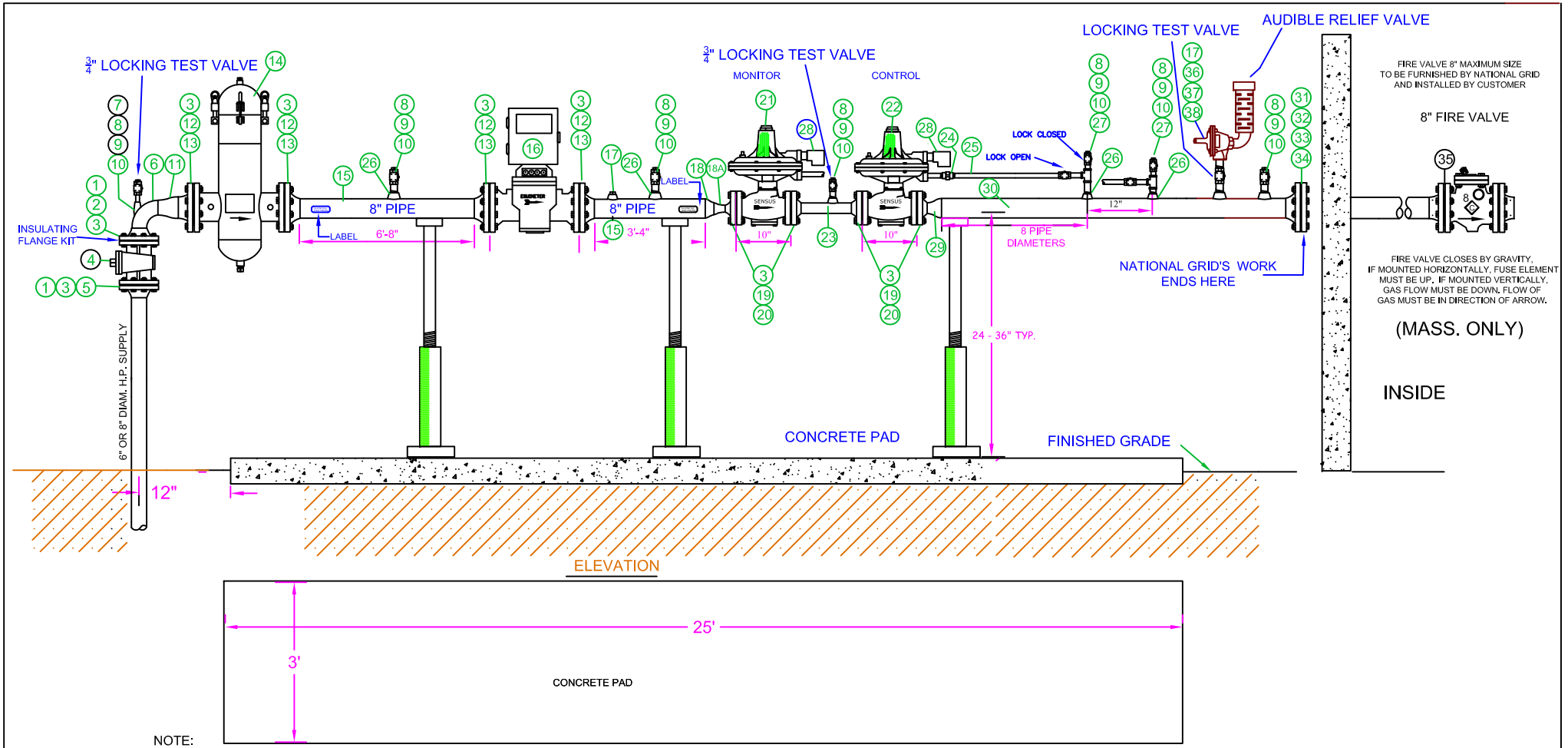
6 INCH TURBO METER W/MONITOR CONTROL 2" REGULATORS

DATE: 10/31/2007	EFFECTIVE DATE: 12/15/2022
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6700
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1	FLANGE 4” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314430	2	FOR 4” SERVICE
	OR FLANGE 6” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308659	2	FOR 6” SERVICE
2	INSULATING FLANGED KIT 4” 150# CLASS	9341024	1	FOR 4” SERVICE
3	**OR** INSULATING FLANGED KIT 6” 150# CLASS	9341026	1	FOR 6” SERVICE
	BOLTS – STUD – 5/8” X 3.5” LONG WITH 2 NUTS CORROSION RESISTANT (PREFERRED)	9392186	64	FOR 4” SERVICE FOR 4” SERVICE
	BOLTS STUD 5/8” X 3.5” LONG	9325078	32	
	WITH NUTS	9325024	64	
	BOLTS – STUD – 5/8” X 3.5” LONG WITH 2 NUTS CORROSION RESISTANT (PREFERRED)	9392185	56	FOR 6” SERVICE FOR 6” SERVICE
	OR BOLTS STUD – ¾” X 4” LONG	9325019	56	
	WITH NUTS	9328587	112	
4	VALVE, 4” PLUG FLANGED END FIG. 143 OR EQ.	9382541	1	FOR 4” SERVICE
	VALVE, 4” BALL VALVE BALON FLANGED	9306262	1	
	OR VALVE, 6” PLUG FLANGED END FIG. 143 OR EQ	9341983	1	FOR 6” SERVICE
	VALVE, 4” BALL VALVE BALON FLANGED	9389308	1	
5	GASKET 4” FULL FACE 150# FLEXITALLIC SIGMA 588 PINK	9341159	1	FOR 4” SERVICE
	OR GASKET 6” FULL FACE 150# SIGMA 588 PINK	9332599	1	FOR 6” SERVICE
6	ELBOW, 4” 90 DEG., STEEL, WELD END STD. WALL A-234	9315385	1	FOR 4” SERVICE
	OR ELBOW, 6” 90 DEG., STEEL, WELD END STD. WALL A-234	9315528	1	FOR 6” SERVICE
7	ELBOW-LET ¾” FOR 6” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9340721	9	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	9	
10	PLUG ¾” SOLID	9312288	7	
11	REDUCER 6”X4” CONC, STEEL, WELD END PER A-234 WPB	9315714	1	FOR 4” SERVICE
12	FLANGE 6” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308659	4	
13	GASKET 6” FULL FACE 150# FLEXITALLIC SIGMA 588	9332599	4	
14	FILTER 6” AMERICAN KLEANLINE FLANGED ENDS	NON STOCK	1	OR 6” STRAINER ITEM ID 00301052
15	PIPE 6” STEEL STANDARD WALL BARE, 0.280” WALL	9340926	2	PER ASTM A-53
16	METER 6” TURBINE METER FLANGED ENDS	METER OPS	1	
17	THRED-O-LET 1” X 4” PIPE PER A-105	9342081	2	
18	REDUCER 6”X2” CONC, STEEL, WELD END PER A-234 WPB	NON STOCK	2	
	OR USE 6”X3” 9308757 AND 3” X 2” 9315489			
19	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	1	
20	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	4	
21	REGULATOR 2” FLANGED ENDS SENSUS 121	9323060	1	
22	REGULATOR 2” FLANGED ENDS SENSUS 121 OR	9323060	1	
	REGULATOR FIORENTINI 2” NORVAL	9394712	2	USE MONITOR KIT 9394713
23	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	3’	FOR THE MONITOR REGULATOR
24	UNION ¾”	9385450	1	
25	PIPE ¾” SCH. 40 BARE PER A-53	9322720	4	
26	THRED-O-LET ¾” X 4” PIPE	9341652	7	
27	TEE - ¾” THREADED	9315887	2	
28	1” VENT SCREENED	9315859	2	
29	REDUCER 2” X CUSTOMER HOUSE LINE SIZE	-	1	
30	PIPE, STEEL CUSTOMER HOUSE LINE SIZE	-	A/R	
31	FLANGE, WELD NECK – HOUSE LINE SIZE	-	1	
32	GASKET HOUSE LINE SIZE	-	1	
33	BOLTS – DETERMINED BY FLANGE SIZE	-	8	
34	BLIND FLANGE – HOUSE LINE SIZE	-	1	
35	FIRE VALVE 6” FLANGED END ESOV-0600	9322638	1	
36	NIPPLE 1” X 4” LONG	9315973	2	
37	VALVE 1” LOCKWING – LOCKED OPEN	9312256	1	
38	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393355	1	
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393264		
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393263		
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H	9358319		

BILL OF MATERIAL FOR 6” TURBINE METER



NOTE:
1. BYPASS PROVISION FOR MONITOR-CONTROL REGULATOR MAINTENANCE MAY BE REQUIRED WHEN INSTALLATION CANNOT SHUT DOWN FOR INSPECTION AND MAINTENANCE.
2. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.
3. CONTROL LINES SHALL BE CONNECTED TO PIPING A MINIMUM OF 8 PIPE DIAMETERS FROM REDUCERS, ELBOWS AND VALVES.

ELEVATED GAS PRESS. LABEL

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8 INCH TURBO METER W/MONITOR CONTROL 2" REGULATORS

REVISIONS: ADDED RELIEF VALVES WITH AUDIBLE WHISTLE

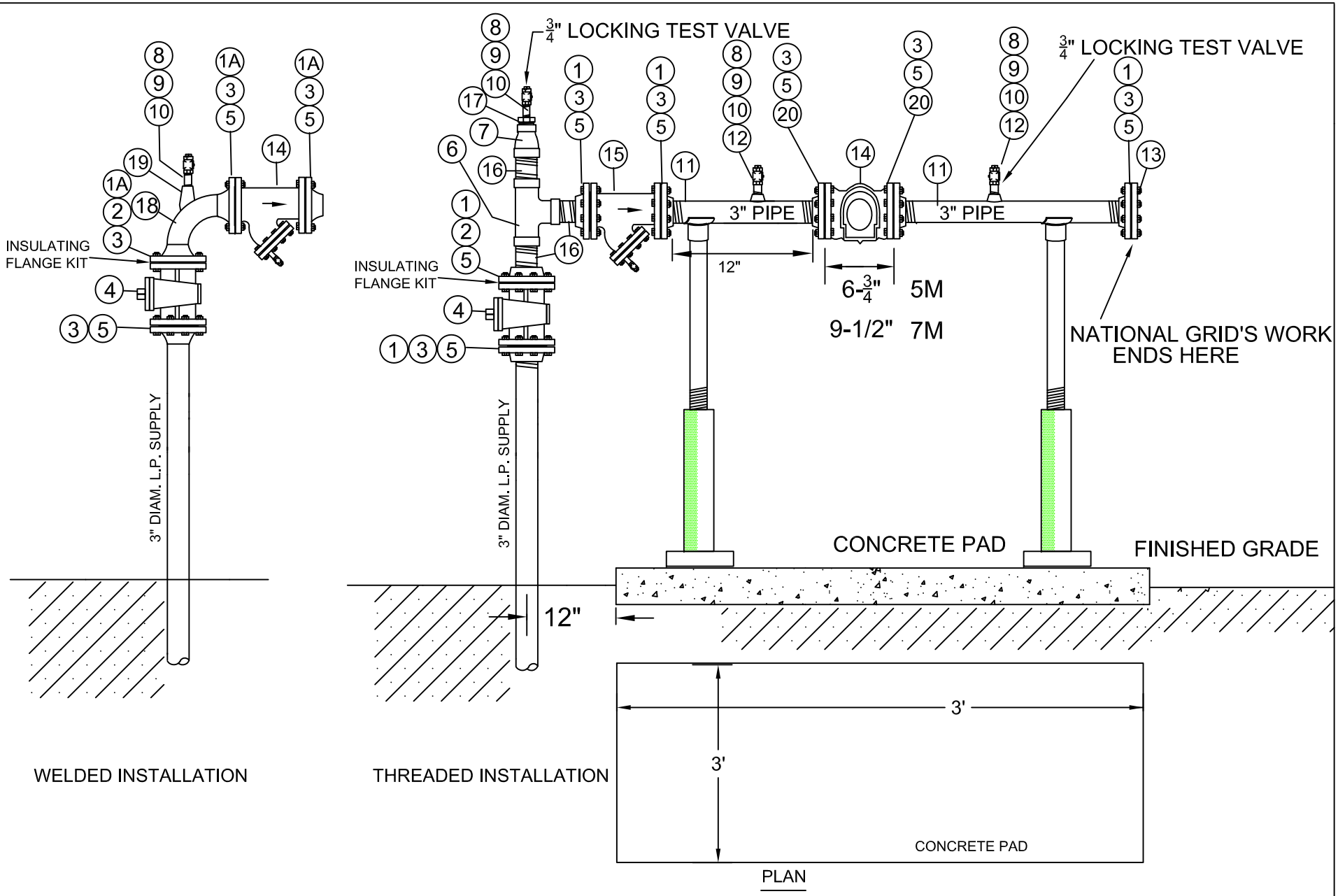
DATE: 10/31/2007
DESIGN: PAUL GUGLIOTTA
DRAWN: PAUL GUGLIOTTA

EFFECTIVE DATE: 12/25/2022
STD. DWG. NO. MTRS-6705

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 6" 150# WELD NECK FLAT FACE PER A-105 GR. B	9308659	2	FOR 6" SERVICE
	OR FLANGE 8" 150# WELD NECK FLAT FACE PER A-105 GR. B	9308748	2	FOR 8" SERVICE
2	INSULATING FLANGED KIT 6" 150# CLASS	9341026	1	FOR 6" SERVICE
3	**OR** INSULATING FLANGED KIT 8" 150# CLASS	9341027	1	FOR 8" SERVICE
	BOLTS STUD – ¾" X 6.5" LONG	9325087	56	FOR 6" SERVICE
	WITH NUTS	9328587	112	FOR 6" SERVICE
	BOLTS STUD – ¾" X 5" LONG -ANTI-CORROSION WITH 2 NUTS	9392185	56	FOR 6" SERVICE
4	VALVE, 6" PLUG FLANGED END FIG. 143 OR EQ. or	9341983	1	FOR 6" SERVICE
	VLAVE, BALL CLASS 150 – BALON R-F12-FF	9389308	1	FOR 6" SERVICE
	OR VALVE, 8" PLUG FLANGED END FIG. 143 OR EQ	9341984	1	FOR 8" SERVICE
5	GASKET 6" FULL FACE 150# FLEXITALLIC SIGMA 588	9332599	1	FOR 6" SERVICE
	OR GASKET 8" FULL FACE 150# FLEXITALLIC SIGMA 588	9341168	1	FOR 8" SERVICE
6	ELBOW, 6" 90 DEG., STEEL, WELD END STD. WALL A-234	9315528	1	FOR 6" SERVICE
	OR ELBOW, 8" 90 DEG., STEEL, WELD END STD. WALL A-234	9315387	1	FOR 8" SERVICE
7	ELBOW-LET ¾" FOR 6" ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	9	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	9	
10	PLUG ¾" SOLID	9312288	7	
11	REDUCER 8"X6" CONC, STEEL, WELD END PER A-234 WPB	9315715	1	FOR 6" SERVICE
12	FLANGE 8" 150# WELD NECK FLAT FACE PER A-105 GR. B	9308748	4	
13	GASKET 8" FULL FACE 150# FLEXITALLIC SIGMA 588	9341168	4	
14	FILTER 8" AMERICAN KLEANLINE FLANGED ENDS	NON STOCK	1	OR 8" STRAINER
15	PIPE 8" STEEL STANDARD WALL BARE, 0.322" WALL	9340824	2	PER ASTM A-53
16	METER 8" TURBINE METER FLANGED ENDS	METER OPS	1	
17	THRED-O-LET 1" X 8" PIPE PER A-105	9342081	2	
18	REDUCER 8"X4" CONC, STEEL, WELD END PER A-234 WPB	9315725	2	
18A	REDUCER 4"X2" CONC, STEEL, WELD END PER A-234 WPB	9315713		
19	FLANGE 2" 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	1	
20	GASKET 2" RING 150# FLEXITALLIC SIGMA 588	9341161	4	
21	REGULATOR 2" FLANGED ENDS SENSUS 121	9323060	1	
22	REGULATOR 2" FLANGED ENDS SENSUS 121	9323060	1	
	REGULATOR FIORENTINI 2" NORVAL	9394712	2	USE MONITOR KIT 9394713
23	PIPE 2" STEEL, STD. WALL 0.154" WALL BARE PER A-53	9322718	3'	FOR THE MONITOR REGULATOR
24	UNION ¾"	9385450	1	
25	PIPE ¾" SCH. 40 BARE PER A-53	9322720	4	
26	THRED-O-LET ¾" X 4" PIPE	9341652	7	
27	TEE - ¾" THREADED	9315887	2	
28	1" VENT SCREENED	9315859	2	
29	REDUCER 2" X CUSTOMER HOUSE LINE SIZE	-	1	
30	PIPE, STEEL CUSTOMER HOUSE LINE SIZE	-	A/R	
31	FLANGE, WELD NECK – HOUSE LINE SIZE	-	1	
32	GASKET HOUSE LINE SIZE	-	1	
33	BOLTS – DETERMINED BY FLANGE SIZE	-	8	
34	BLIND FLANGE – HOUSE LINE SIZE	-	1	
35	FIRE VALVE 8" FLANGED END ESOV-0800-BPSL-150-C-08-165F	9322663	1	
-	8" 150#	-	-	
36	NIPPLE 1" X 4" LONG	9315973	2	
37	VALVE 1" LOCKWING – LOCKED OPEN	9312256	1	
38	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393355	1	
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393264		
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H OR	9393263		
	RELIEF VALVE – WITH AUDIBLE WHISTLE - FISHER 289H	9358319		

BILL OF MATERIAL 8" TURBINE METER



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MA

5M/7M LOW PRESSURE METERING

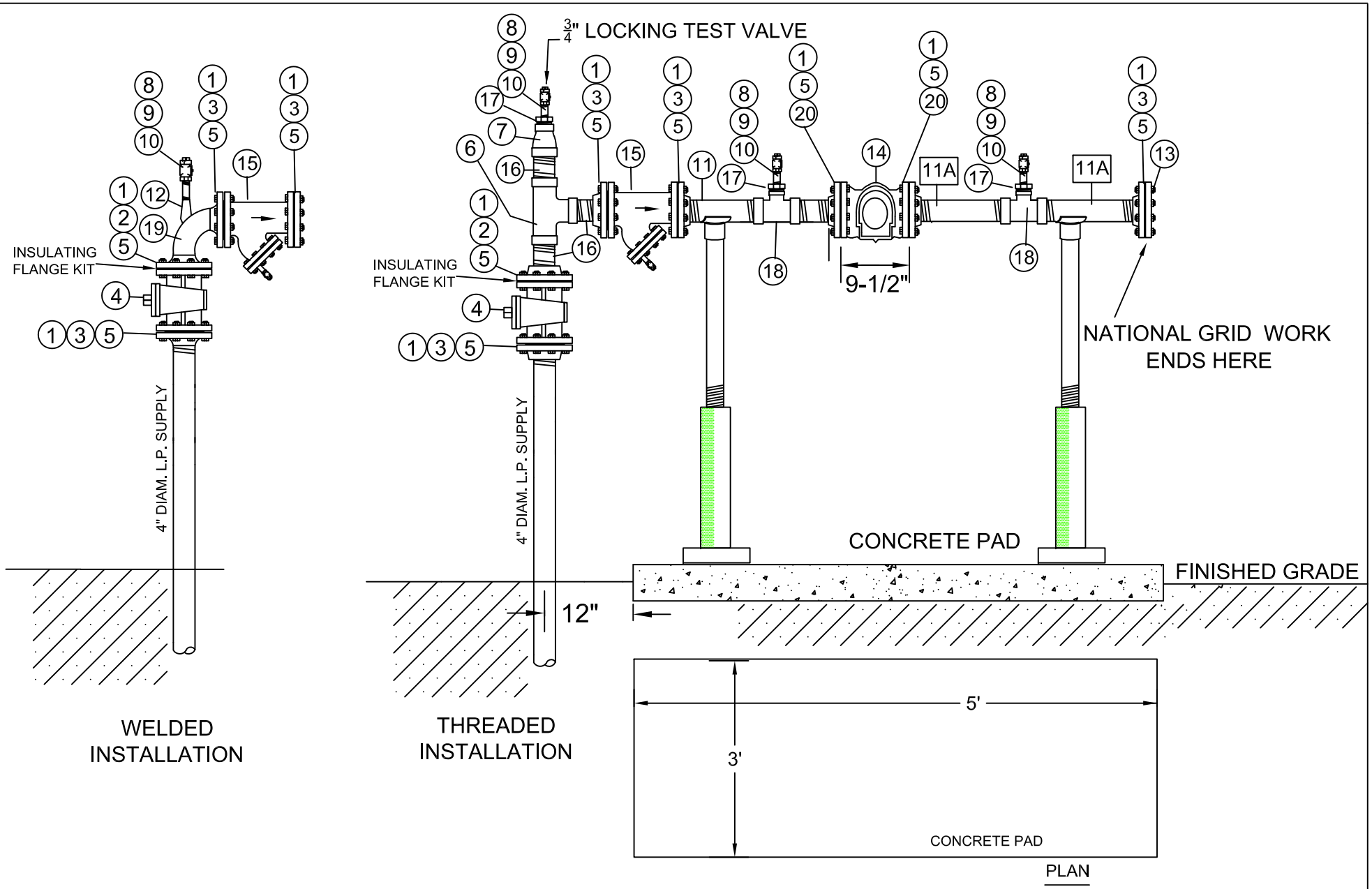
KEY CHANGES: REVISED USING SAP ITEM ID #'S

DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. **MTRS-6665**
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 3" 125# THREADED FLAT FACE C.I.	9308670	6	FOR THREADED HEADERS
1A	FLANGE 3" 150#, WELD NECK, FLAT FACE, STEEL	9314431	6	FOR WELDED HEADERS
2	INSULATING FLANGED KIT 3" 150# CLASS	9340959	1	
3	BOLTS MACHINE – 5/8" X 3.5"	9325019	20	
	WITH NUTS or	9325024	40	
	BOLTS STUD 5/8" X 4" LONG – CORROSION RESISTANT W/2 HEX NUTS	9392186	20	
4	VALVE, 3" PLUG FLANGED END FIG. 143 OR EQ.	9341981	1	
5	GASKET 3" RING FLEXITALLIC SIGMA 588	9341158	6	
6	TEE, 3", M.I. THREADED	9308371	1	FOR THREADED HEADERS
7	REDUCER (COUPLING REDUCING) 3"X2", M.I. THREADED	9307714	1	FOR THREADED HEADERS
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	3	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾" SOLID	9312288	3	
11	NIPPLE 3" X 12" STEEL, STD. WALL 0.154" WALL, GR. B	9308649	6'	OR 3" PIPE FOR WELDED HEADERS 4140110
12	THRED-O-LET ¾" X 4" PIPE	9341652	2	OR USE 3" X 1" THREADED REDUCING TEE
13	FLANGE 3" BLIND 150#	9307751	1	
14	METER 5M/7M - 3" ROTARY FLANGED ENDS	---	1	
15	STRAINER 3" Y-TYPE FLANGED ENDS	9340182	1	
16	NIPPLE 3" X 3" STEEL, STD. WALL GRADE B	9308647	3	
17	BUSHING 2" X ¾"	9310258	1	
18	ELBOW, 3" 90 DEGREE, WELD END, STD. WALL A234 WPB	9315471	1	FOR WELDED HEADERS
19	ELBOW-LET ¾"	9341213	1	FOR WELDED HEADERS
20	BOLT, HEX HEAD MACHINE 5/8" X 1-1/2" LONG	9325042	8	

BILL OF MATERIAL 5M/7M LP MAIN/LP METERING



nationalgrid MA

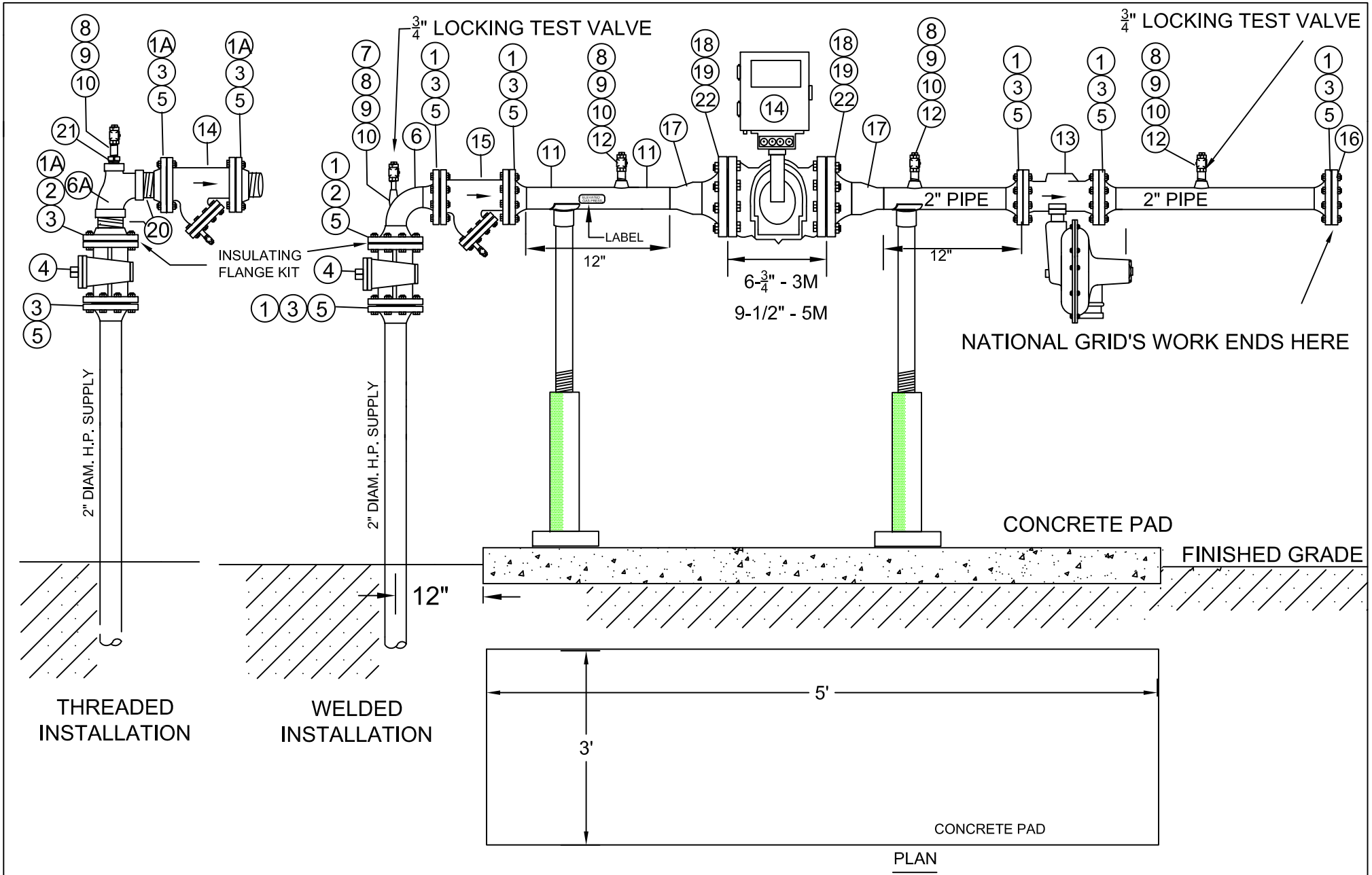
11M/16M LOW PRESSURE METERING

REVISIONS: REVISED USING SAP ITEM ID #'S	DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
	DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6667
	DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1 OR	FLANGE 4" 125# THREADED FLAT FACE C.I.	9306529	6	FOR THREADED HEADERS
1A	FLANGE 4" WELD NECK, FLAT FACE 150# CLASS	9314430	6	FOR WELDED HEADERS
2	INSULATING FLANGED KIT 4" 150# CLASS	9341024	1	
3	BOLTS MACHINE – 5/8" X 3.5"	9325019	20	
	WITH NUTS OR	9325024	40	
	BOLTS STUD 5/8" X 4" LONG – CORROSION RESISTANT W/ 2 NUTS	9392186	20	
4	VALVE, 4" PLUG FLANGED END FIG. 143 OR EQ.	9382541	1	
5	GASKET 4" FULL FACE FLEXITALLIC SIGMA 588	9341159	6	
6	TEE, 4" x 4" x 4", M.I. THREADED	9341636	1	FOR THREADED HEADERS
7	REDUCER (COUPLING REDUCING) 4"X2", M.I. THREADED	9307674	1	
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	3	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾" SOLID	9312288	3	
11	NIPPLE 4" X 12" CUT TO LENGTH, STD. WALL 0.154" WALL,	9308752	4	OR 4" PIPE FOR WELDED HEADERS 4140120
11A	PIPE CUSTOMER'S HOUSE LINE SIZE	---	-	
12	ELBOWLET ¾" FOR 4" ELBOW (FOR WELDED HEADERS)	9349812	1	FOR WELDED HEADERS
13	FLANGE 4" BLIND 150#	9306252	1	
14	METER 11M or 16M - 4" ROTARY FLANGED ENDS	---	1	
15	STRAINER 4" Y-TYPE FLANGED ENDS	9340157	1	
16	NIPPLE 4" X 4" STEEL, STD. WALL GRADE B	9308744	1	
17	BUSHING 2" X ¾"	9310258	3	
18	TEE 4" X 2" THREADED (FOR THREADED HREADERS)	9308531	2	
	OR USE ¾" THRED-O-LETS FOR WELDED HEADERS	9341652	2	
19	ELBOW 4" STEEL WELD END, STD. WALL, LONG RADIUS	9315385	1	
20	BOLT, HEX HEAD MACHINE 5/8" X 1-1/2" LONG	9325042	8	

BILL OF MATERIAL 5M LP MAIN/LP METERING



NOTE:
1. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

ELEVATED GAS PRESS. LABEL

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5M / 7M HP METERING

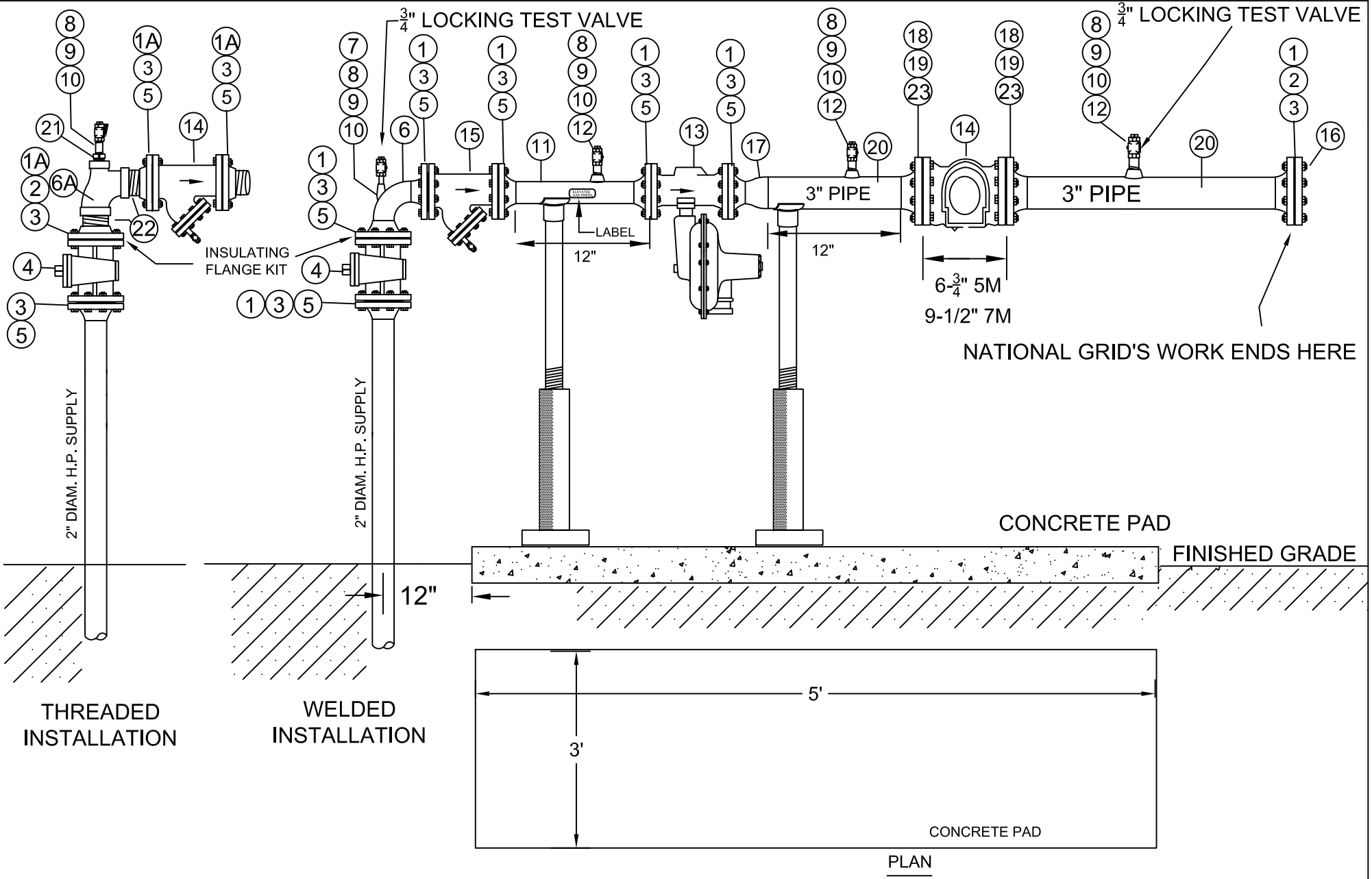
KEY CHANGES: REVISED USING SAP ITEM ID #'S

DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. **MTRS-6670**
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1 or	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	6	FOR WELDED HEADERS
1A	FLANGE 2” THREADED, FLAT FACE 125#	9308663	6	FOR THREADED HEADERS
2	INSULATING FLANGED KIT 2” 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8” X 3.5”	9325019	36	
	WITH NUTS	9325024	72	
	BOLTS STUD 5/8” X 4” LONG – CORROSION RESISTANT W/NUTS	9392186	36	
4	VALVE, 2” PLUG FLANGED END FIG. 143 OR EQ.	9341980	1	
5	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	6	
6	ELBOW, 2” 90 DEG., STEEL, WELD END STD. WALL A-234	9315522	1	FOR WELDED HEADERS
6A	TEE 2” X 1-1/4” X 2” (REDUCING RUN) THREADED	9322580	1	FOR THREADED HEADERS
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	FOR WELDED HEADERS
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	4	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	4	
10	PLUG ¾” SOLID	9312288	4	
11	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	6’	ALT. USE 2” THREADED NIPPLES
12	THRED-O-LET ¾” X 4” PIPE	9341652	2	ALT. USE 2” X ¾” THREADED TEES
13	REGULATOR 2” FLANGED ENDS	---	1	To be specified by engineering
14	METER 5M / 7M - 3” ROTARY FLANGED ENDS	---	1	
15	STRAINER 2” Y-TYPE FLANGED ENDS	9340158	1	
16	FLANGE 2” BLIND 150#	9382074	1	
17	REDUCER 3” X 2” CONC., WELD END, PER A234 WPB	9315489	2	ALT. USE THREADED REDUCER ID 9307714
18	FLANGE 3” 150# WELD, FLAT FACE PER A105 GR. B	9314431	2	ALT. USE THREADED FLANGE ID 9308670
19	GASKET 3” RING FLEXITALIC SIGMA 588	9341162	2	
20	NIPPLES 2” X 3” STEEL, STD. WALL GRADE B	9306532	2	
21	BUSHING 1-1/4” X ¾”	9339863	1	FOR THREADED HEADERS
22	BOLT, HEX HEAD MACHINE 5/8” X 1-3/4” LONG	9325046	8	

BILL OF MATERIAL 5M / 7M HP METERING



NOTE:
1. SERVICE RISER SHOULD BE LOCATED TO ALLOW REGULATOR VENTS TO BE A MINIMUM OF 10 FEET FROM ANY FORCED AIR INLET TO BUILDING.

ELEVATED GAS PRESS. LABEL

nationalgrid MA

5M / 7M METERING w/REGULATOR

REVISIONS: REVISED USING SAP ITEM ID #'S

DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6675
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

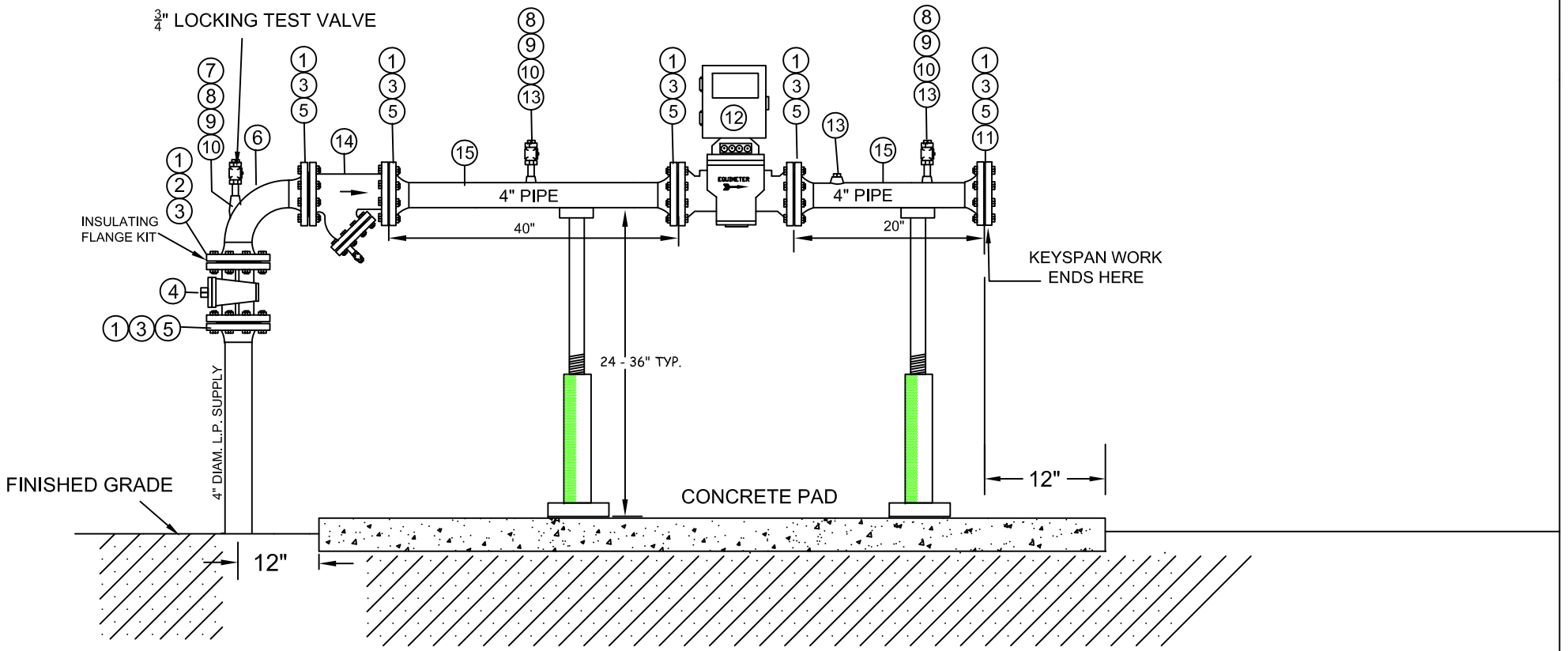
ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 2” THREADED FLAT FACE PER A-105 GR. B	9308663	5	FOR THREADED HEADERS
1A	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	5	FOR WELDED HEADERS
2	INSULATING FLANGED KIT 2” 150# CLASS	9340992	1	
3	BOLTS MACHINE – 5/8” X 3.5”	9325019	36	
	WITH NUTS	9325024	72	
	BOLTS STUD 5/8” X 4” LONG – CORROSION RESISTANT W/NUTS	9392186	36	preferred
4	VALVE, 2” PLUG FLANGED END FIG. 143 OR EQ.	9341980	1	
5	GASKET 2” RING 150# KLINGER C-4401	9341161	5	
6	ELBOW, 2” 90 DEG., STEEL, WELD END STD. WALL A-234	9315522	1	FOR WELDED HEADERS
6A	TEE, 2”X1-1/4”X2” (REDUCED RUN) THREADED	9322580	1	FOR THREADED HEADER
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	FOR WELDED HEADERS
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	3	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾” SOLID	9312288	3	
11	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	6’	ALT. USE THREADED 2” NIPPLES
12	THRED-O-LET ¾” X 4” PIPE	9341652	2	ALT USE 2” X ¾” THREADED TEE
13	REGULATOR 2” FLANGED ENDS	---	1	To be specified by engineering
14	METER 5M OR 7M - 3” ROTARY FLANGED ENDS	---	1	
15	STRAINER 2” Y-TYPE FLANGED ENDS	9340158	1	
16	FLANGE 3” BLIND 150#	9307751	1	
17	REDUCER 3” X 2” CONC., WELD END, PER A234 WPB	9315489	1	ALT. USE THREADED REDUCER ID 9307714
18	FLANGE 3” 150# WELD, FLAT FACE PER A105 GR. B	9314431	3	ALT. USE THREADED FLANGE ID 9308670
19	GASKET 3” RING TYPE FLEXITALLIC SIGMA 588	9341162	3	
20	PIPE 3” STEEL, STD. WALL 0.216” WALL BARE PER A-53	9340818	4’	
21	BUSHING 1-1/4” X ¾”	9339863	1	FOR THREADED HEADERS
22	NIPPLES 2” X 3”, STEEL, STD. WALL GRADE B	9306532	2	FOR THREADED HEADERS
23	BOLT, HEX HEAD MACHINE 5/8” X 1-3/4” LONG	9325046	8	

BILL OF MATERIAL 5M HP / 7M MAIN/LP METERING

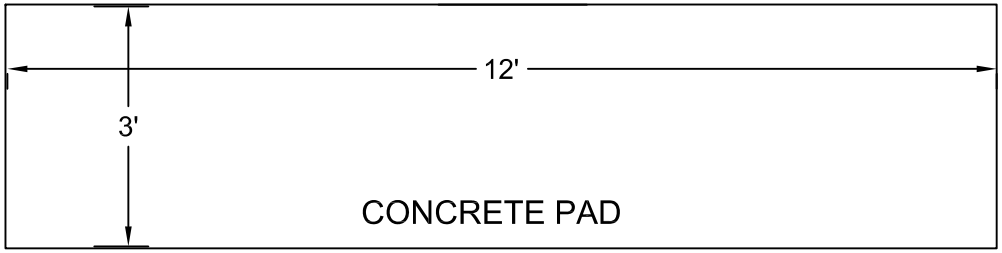
BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 6” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308659	2	FOR 6” SERVICE
	OR FLANGE 8” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308748	2	FOR 8” SERVICE
2	INSULATING FLANGED KIT 6” 150# CLASS	9341026	1	FOR 6” SERVICE
3	**OR** INSULATING FLANGED KIT 8” 150# CLASS	9341027	1	FOR 8” SERVICE
	BOLTS STUD – ¾” X 6.5” LONG	9325087	56	FOR 6” SERVICE
	WITH NUTS	9328587	112	FOR 6” SERVICE
4	VALVE, 6” PLUG FLANGED END FIG. 143 OR EQ.	9341983	1	FOR 6” SERVICE
	OR VALVE, 8” PLUG FLANGED END FIG. 143 OR EQ	9341984	1	FOR 8” SERVICE
5	GASKET 6” FULL FACE 150# FLEXITALLIC SIGMA 588	9332599	1	FOR 6” SERVICE
	OR GASKET 8” FULL FACE 150# KLINGER C-4402	9341168	1	FOR 8” SERVICE
6	ELBOW, 6” 90 DEG., STEEL, WELD END STD. WALL A-234	9315528	1	FOR 6” SERVICE
	OR ELBOW, 8” 90 DEG., STEEL, WELD END STD. WALL A-234	9315387	1	FOR 8” SERVICE
7	ELBOW-LET ¾” FOR 6” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	9	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	9	
10	PLUG ¾” SOLID	9312288	7	
11	REDUCER 8”X6” CONC, STEEL, WELD END PER A-234 WPB	9342583	1	FOR 6” SERVICE
12	FLANGE 8” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308748	4	
13	GASKET 8” FULL FACE 150# FLEXITALLIC SIGMA 588	9341168	4	
14	FILTER 8” AMERICAN KLEANLINE FLANGED ENDS	NON STOCK	1	OR 8” STRAINER
15	PIPE 8” STEEL STANDARD WALL BARE, 0.322” WALL	9340824	2	PER ASTM A-53
16	METER 8” TURBINE METER FLANGED ENDS	METER OPS	1	
17	THRED-O-LET 1” X 8” PIPE PER A-105	9342081	1	
18	REDUCER 8”X4” CONC, STEEL, WELD END PER A-234 WPB	9342581	2	
18A	REDUCER 4”X2” CONC, STEEL, WELD END PER A-234 WPB	9342652		
19	FLANGE 2” 150# WELD NECK FLAT FACE PER A-105 GR. B	9314322	1	
20	GASKET 2” RING 150# FLEXITALLIC SIGMA 588	9341161	4	
21	REGULATOR 2” FLANGED ENDS SENSUS 121	9323060	1	
22	REGULATOR 2” FLANGED ENDS SENSUS 121	9323060	1	
23	PIPE 2” STEEL, STD. WALL 0.154” WALL BARE PER A-53	9322718	3’	
24	UNION ¾”	9307642	1	
25	PIPE ¾” SCH. 40 BARE PER A-53	9322720	4	
26	THRED-O-LET ¾” X 4” PIPE	9341652	7	
27	TEE - ¾” THREADED	9315887	2	
28	1” VENT SCREENED	9358640	2	
29	REDUCER 2” X CUSTOMER HOUSE LINE SIZE	-	1	
30	PIPE, STEEL CUSTOMER HOUSE LINE SIZE	-	A/R	
31	FLANGE, WELD NECK – HOUSE LINE SIZE	-	1	
32	GASKET HOUSE LINE SIZE	-	1	
33	BOLTS – DETERMINED BY FLANGE SIZE	-	8	
34	BLIND FLANGE – HOUSE LINE SIZE	-	1	
35	FIRE VALVE 8” FLANGED END INNER-TITE S-9800	9322663	1	

BILL OF MATERIAL 8” TURBINE METER



ELEVATION



PLAN

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MA

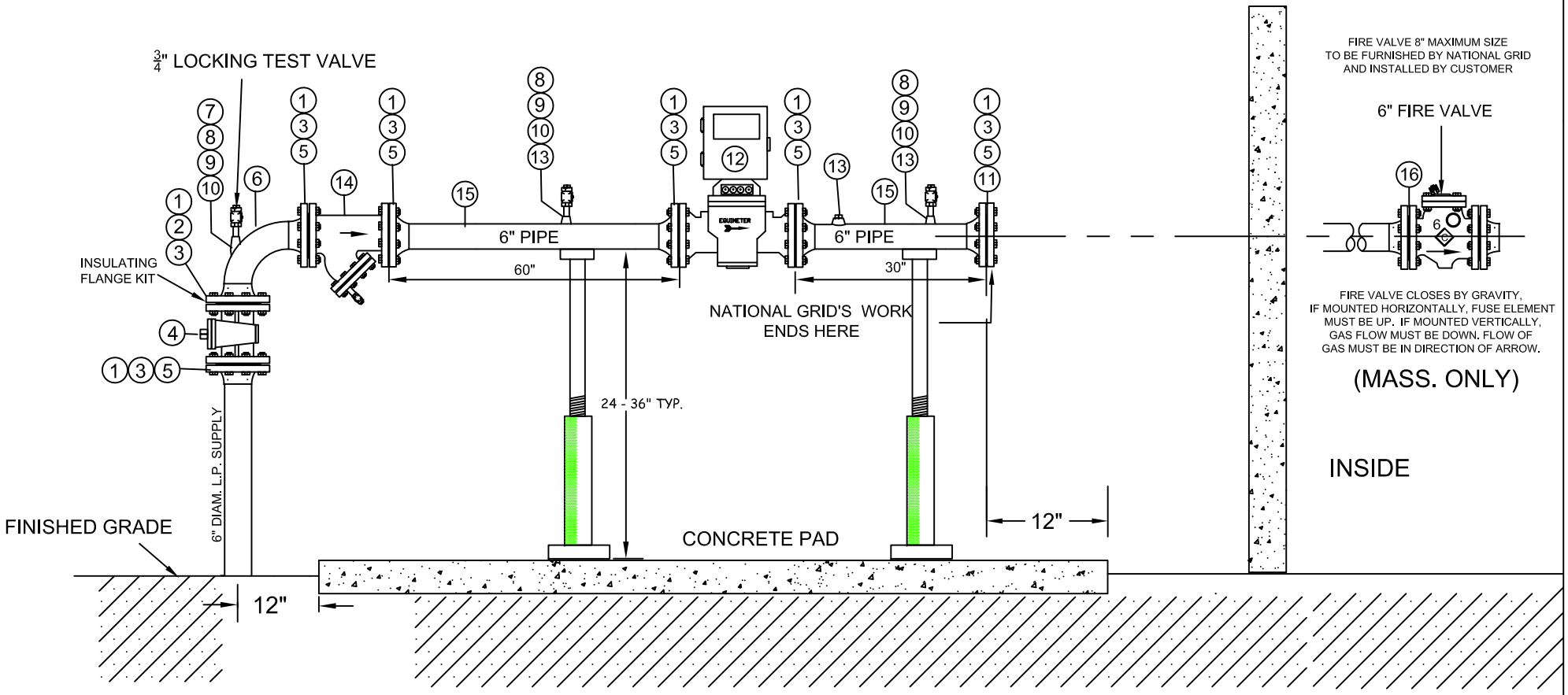
4 INCH TURBO METER ASSEMBLY, LOW PRESSURE

REVISIONS: REVISED USING SAP ITEM ID #'S	DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
	DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6710
	DRAWN: PAUL GUGLIOTTA	

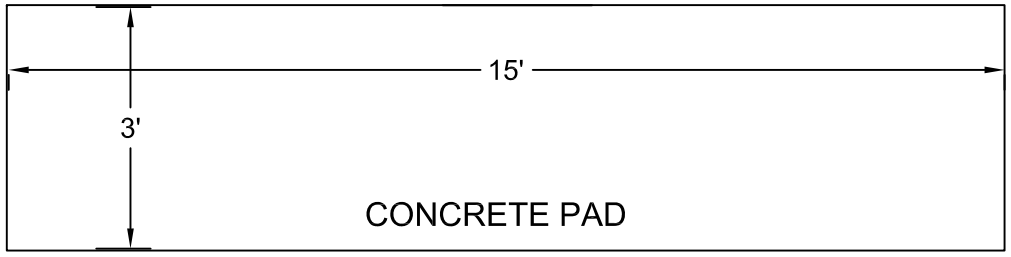
BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1	FLANGE 4" 150# WELD NECK FLAT FACE PER A-105 GR. B	9340588	6	
2	INSULATING FLANGED KIT 4" 150# CLASS	9341024	1	
3	BOLTS STUD – 5/8" X 4" W/2 HEX NUTS CORROSION RESISTANT	9392186	56	
OR	BOLTS STUD – 5/8" X 3.5"	9325019	56	
4	WITH NUTS 5/8"	9325024	112	
5	VALVE, 4" PLUG FLANGED END FIG. 143 OR EQ	9382541	1	
OR	VALVE BALL FLANGED END - BALON	9306262	1	
	GASKET 4" FULL FACE 150# FLEXITALLIC SIGMA 588	9341159	6	
6	ELBOW, 4" 90 DEG., STEEL, WELD END STD. WALL A-234	9315385	1	
7	ELBOW-LET ¾" FOR 4" ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾" X 4.5" LONG PER A-53	9381605	3	
9	VALVE ¾" LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾" SOLID	9312288	3	
11	FLANGE 4" BLIND CLASS 150#	9306252	1	
12	METER 4" TURBINE METER FLANGED ENDS	METER OPS	1	
13	THRED-O-LET 1" X 4" PIPE PER A-105	9342081	3	
14	STRAINER, 4" FLANGED ENDS	9340157	1	OR 4" FILTER (ITEM 941260)
15	PIPE 4" STEEL STANDARD WALL BARE, 0.237" WALL	9340906	8'	PER ASTM A-53

BILL OF MATERIAL FOR 4" LP TURBINE METER 5/5/2020



ELEVATION



PLAN

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MA

6 INCH TURBO METER ASSEMBLY, LOW PRESSURE

REVISIONS: REVISED USING SAP ITEM ID #'S

DATE: 10/31/2007

DESIGN: PAUL GUGLIOTTA

DRAWN: PAUL GUGLIOTTA

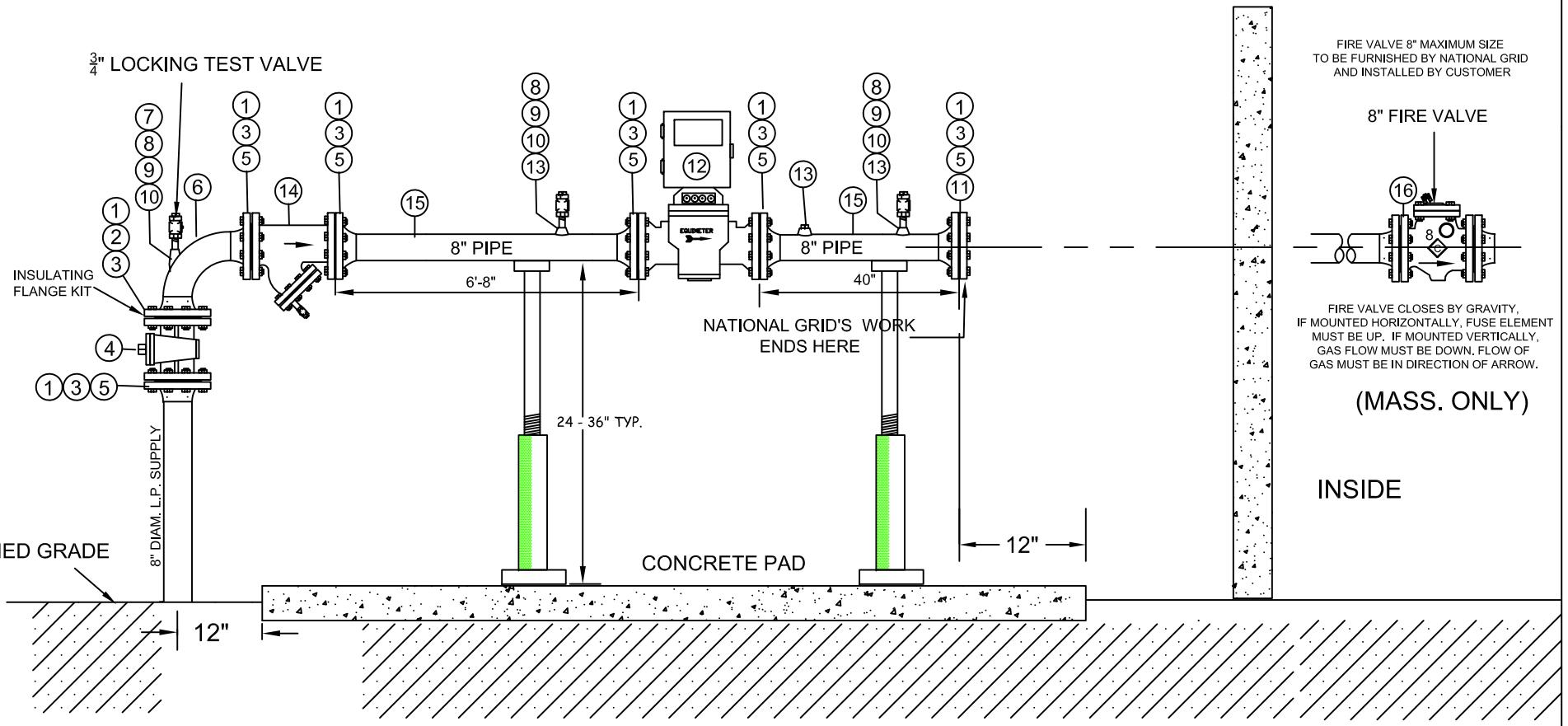
EFFECTIVE DATE: 09/15/2013

STD. DWG. NO. **MTRS-6715**

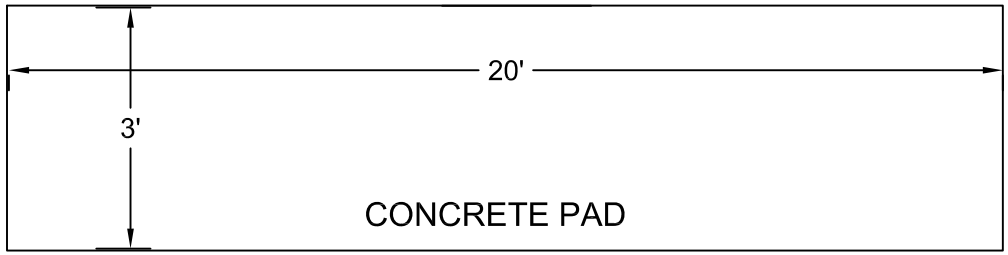
BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D.	QTY	MATERIAL NOTES
1	FLANGE 6” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308659	7	
2	INSULATING FLANGED KIT 6” 150# CLASS	9341026	1	
3	BOLTS MACHINE – 3/4” X 5.0” W/2 NUTS CORROSION RESISTANT	9392185	56	
OR	BOLTS MACHINE – 3/4” X 4.0”	9325078	56	
	WITH NUTS	9328587	112	
4	VALVE, 6” PLUG FLANGED END FIG. 143 OR EQ.	9341983	1	
OR	VALVE, 6” BALL FLANGED ENDS - BALON	9389308	1	
5	GASKET 6” FULL FACE 150# FLEXITALLIC SIGMA 588	9332599	6	
6	ELBOW, 6” 90 DEG., STEEL, WELD END STD. WALL A-234	9307754	1	
7	ELBOW-LET ¾” FOR 4” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	3	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾” SOLID	9312288	4	
11	FLANGE 6” BLIND CLASS 150#	9385747	1	
12	METER 6” TURBINE METER FLANGED ENDS	9340588	1	
13	THRED-O-LET 1” X 4” PIPE PER A-105	9342081	3	
14	STRAINER, 6” FLANGED ENDS	9340186	1	OR 6” FILTER – NON STOCK
15	PIPE 6” STEEL STANDARD WALL BARE, 0.280” WALL	9340926	8’	PER ASTM A-53
16	FIRE VALVE INNER-TITE MODEL S-9800 FLANGED	9322638	1	

BILL OF MATERIAL 6 INCH TURBINE METER LOW PRESSURE



ELEVATION



PLAN

nationalgrid MA

8 INCH TURBO METER ASSEMBLY, LOW PRESSURE

REVISIONS: REVISED USING SAP ITEM ID #'S	
DATE: 10/31/2007	EFFECTIVE DATE: 09/15/2013
DESIGN: PAUL GUGLIOTTA	STD. DWG. NO. MTRS-6720
DRAWN: PAUL GUGLIOTTA	

BILL OF MATERIAL

ITEM	DESCRIPTION	ITEM I.D	QTY	MATERIAL NOTES
1	FLANGE 8” 150# WELD NECK FLAT FACE PER A-105 GR. B	9308748	7	
2	INSULATING FLANGED KIT 8” 150# CLASS	9341027	1	
3	BOLTS MACHINE – 3/4” X 6.5”	9325087	56	
	NUTS ¾”	9328587	112	
4	VALVE, 8” PLUG FLANGED END FIG. 143 OR EQ.	9341984	1	
5	GASKET 8” FULL FACE FLEXITALLIC SIGMA 588	9341168	6	
6	ELBOW, 8” 90 DEG., STEEL, WELD END STD. WALL A-234	9315387	1	
7	ELBOW-LET ¾” FOR 8” ELBOW PER A-105 GR. B	9349812	1	
8	NIPPLE ¾” X 4.5” LONG PER A-53	9381605	3	
9	VALVE ¾” LOCKWING AY 560 B OR EQ	9312257	3	
10	PLUG ¾” SOLID	9312288	4	
11	FLANGE 8” BLIND CLASS 150#	9307750	1	
12	METER 8” TURBINE METER FLANGED ENDS	9340588	1	
13	THRED-O-LET 1” X 4” PIPE PER A-105	9342081	3	
14	STRAINER, 8” FLANGED ENDS	NON STOCK	1	OR 8” FILTER NON STOCK
15	PIPE 8” STEEL STANDARD WALL BARE, 0.322” WALL	9340824	10’	PER ASTM A-53
16	FIRE VALVE INNER-TITE MODEL S-9800	9322663	1	

BILL OF MATERIAL – 8 INCH TURBINE METER LOW PRESSURE

TABLE 1 – LIST OF BOLTS, GASKETS FOR FLANGES 1-1/4" TO 30"

REFER TO TABLE 8 FOR TORQUE VALUES
FF = FLAT FACE FLANGES RF = RAISED FACE FLANGES

FLANGE SIZE	CLASS	MACHINE BOLT SIZE SEE TABLES 6&7	STUD BOLT SIZE (MIN. LENGTH) SEE TABLES 6&7	QTY
1-1/4"	150# FF	1/2"X2"	1/2"X2.75"	4
2"	150# FF 150# RF	5/8"X2.75"	5/8"X3.5"	4
2"	300# RF	5/8"X3.0"	5/8"X 3.5"	8
3"	150# FF 150# RF	5/8"X3.5"	5/8"X4.0"	4
4"	150# FF 150# RF	5/8"X3.5"	5/8"X4.0"	8
4"	300# RF	3/4"X4.0"	3/4"X4.5"	8
6"	150# FF 150# RF	3/4"X4.0"	3/4" X 4"	8
6"	300# RF	3/4"X4.25"	3/4"X5.0"	12
8"	150# FF 150# RF	3/4"X4.0"	3/4"X4.25"	8
8"	300# RF	7/8"X4.75"	7/8"X5.5"	12
10"	150# FF 150# RF	7/8"X4.0"	7/8"X4.75"	12
10"	300# RF	1" X 5.5"	1" X 6.25"	16
12"	150# FF 150# RF	7/8"X4.25"	7/8"X4.75"	12
12"	300# RF	1-1/8"X6.0"	1-1/8"X6.75"	16
14"	150# FF	1"X4.5"	1"X 5.25"	12
14"	300# RF	1-1/8"X6.25"	1-1/8"X7.0"	20
16"	150# FF	1" X 4.75"	1"X5.5"	16
16"	300# RF	1-1/4"X6.5"	1-1/4"X7.5"	20
20"	150# FF	1-1/8"X5.5"	1-1/8"X6.25"	20
20"	300# RF	1-1/4"X7.25"	1-1/4"X8.25"	24
24"	150# FF	1-1/4"X6.0"	1-1/4"X7.0"	20
24"	300# RF	1-1/2"X8.0"	1-1/2"X9.25"	24
30" 30"	300# RF 400# RF	- -	1-3/4X12.0" 2" X 14.0"	28 28

TABLE 2 – LIST OF NUTS

NUTS	SIZE	DESCRIPTION	ITEM ID LOCATION AVAILABLE	ITEM ID LOCATION AVAILABLE
HEX	1/4	STAINLESS STEEL 20 UNC	9304776 SUTTON - RI	
HEAVY HEX	3/8"	HEAVY HEX A194 GRADE 2H A563 ZINC	9322725 SUTTON - MASS	
HEAVY HEX	1/2"	HEAVY HEX A194 GRADE 2H A194 13 UNC	9328628 LI / NYC	
HEAVY HEX	5/8"	HEAVY HEX A194 GRADE 2H A194 11 UNC	9328559 ALL REGIONS	
HEAVY HEX	3/4"	HEAVY HEX A194 GRADE 2H A194 10 UNC	9328587 LI / NYC / MASS	9310607 RI
HEAVY HEX	7/8"	HEAVY HEX A194 GRADE 2H A194 9 UNC	9328588 LI / NYC	
HEAVY HEX	1"	HEAVY HEX A194 GRADE 2H A194 8 UNC	9328589 LI / NYC / MASS	
HEAVY HEX	1-1/8"	HEAVY HEX A194 GRADE 2H A194 7 UNC	9325031 SUTTON MASS	
HEAVY HEX	1-1/4"	HEAVY HEX A194 GRADE 2H A194 7 UNC	9325032 SUTTON MASS	9328632 LI / NYC
HEAVY HEX	1-3/8"	HEAVY HEX A194 GRADE 2H A194 8 UNC	9328658 LI / NYC	
HEAVY HEX	1-1/2"	HEAVY HEX A194 GRADE 2H A194 8 UNC	9328660 LI / NYC	
HEAVY HEX	1-5/8"	HEAVY HEX A194 GRADE 2H A194 8 UNC	9328661 LI / NYC	

TABLE 3 – LIST OF WASHERS

WASHERS	OD SIZE	CENTER HOLE SIZE	ITEM ID AND LOCATION AVAILABLE
WASHERS	3/8"	7/16" CENTER HOLE	9328237 LI / NYC
WASHERS	7/16"	1/2" CENTER HOLE	9328239 LI / NYC
WASHERS	1/2"	9/16" CENTER HOLE	9328208 LI / NYC
WASHERS	5/8"	11/16" CENTER HOLE	9328238 LI / NYC
WASHERS	3/4"	13/16" CENTER HOLE	9328236 LI / MASS / NYC
WASHERS	7/8"	FOR 7/8" BOLT 15/16" CENTER HOLE	9328240 LI / NYC
WASHERS	1-1/4"	1-5/16" CENTER HOLE	9328205 LI / NYC
WASHERS	1-5/16"	FOR 5/8" BOLT	9328196 LI / NYC
WASHERS	1-3/32"	FOR ½" BOLT	9334232 LI / NYC
WASHERS	1-1/2"	FOR ¾" BOLT	9328160 LI / NYC
WASHERS	2-1/2"	1-1/16" CENTER HOLE	9328207 LI / MASS / NYC

nationalgrid ALL REGIONS

GASKETS AND BOLTS

REVISIONS: ADDED NEW ITEMS

DATE: 06/01/2007
DESIGN: PAUL GUGLIOTTA
DRAWN: PAUL GUGLIOTTA

EFFECTIVE DATE: 12/15/2016
STD. DWG. No. **FITS-6115**

TABLE 4 – LIST OF INSULATING FLANGE KITS

INSULATING FLANGE KITS	SIZE	ORACLE ITEM	LOCATION	PEOPLESOFT ITEM UNY / RI
INSULATING FLANGE KITS	1" 150#	9340984	LI/NYC	
INSULATING FLANGE KITS	1-1/2" 150#	9340981	LI/NYC	
INSULATING FLANGE KITS	2" 150#	9340992	LI/NE/NYC	9312579
INSULATING FLANGE KITS	2-1/2" 150#	9340991	LI/NYC	
INSULATING FLANGE KITS	3" 150#	9340959	LI/NE/NYC	9308154 (RI ONLY)
INSULATING FLANGE KITS	4" 150#	9341024	LI/NE/NYC	9312578
INSULATING FLANGE KITS	6" 150#	9341026	LI/NE/NYC	9312577
INSULATING FLANGE KITS	8" 150#	9341027	LI/NE/NYC	9312576
INSULATING FLANGE KITS	10" 150#	9340985	LI/NYC	
INSULATING FLANGE KITS	12" 150#	9340987	LI/NE/NYC	9312575
INSULATING FLANGE KITS	16" 150#	9340989	LI/NYC	
INSULATING FLANGE KITS	20" 150#	9341019	LI/NYC	
INSULATING FLANGE KITS	24" 150#	9341020	LI/NYC	
INSULATING FLANGE KITS	36" 150#	9341023	LI/NYC	
INSULATING FLANGE KITS	1-1/4" 300#	9340983	LI/NYC	
INSULATING FLANGE KITS	1-1/2" 300#	9340982	LI/NYC	
INSULATING FLANGE KITS	2" 300#	9340958	LI/NYC	9312574 (UNY ONLY)
INSULATING FLANGE KITS	3" 300#	9340960	LI/NYC	
INSULATING FLANGE KITS	4" 300#	9341025	LI/NYC	9314928 (UNY ONLY)
INSULATING FLANGE KITS	6" 300#	9340980	LI/NYC	9312573 (UNY ONLY)
INSULATING FLANGE KITS	8" 300#	9341028	LI/NYC	9312572 (UNY ONLY)
INSULATING FLANGE KITS	10" 300#	9340986	LI/NYC	9312571 (UNY ONLY)
INSULATING FLANGE KITS	12" 300#	9340988	LI/NYC	9312570 (UNY ONLY)
INSULATING FLANGE KITS	16" 300#	9340990	LI/NYC	
INSULATING FLANGE KITS	24" 300#	9341021	LI/NYC	
INSULATING FLANGE KITS	24" 600#	9341022	LI/NYC	

TABLE 5 – LIST OF GASKETS

GASKETS	SIZE	DESCRIPTION	ORACLE ITEM	LOCATION	PEOPLESOFT UNY / RI
FULL FACE	2” 150#	1/16” THICK – NON ASBESTOS	9333167	LI/NYC	9315688
FULL FACE	3" 150#		9341158	LI/NE/NYC	9312067
FULL FACE	4" 150#		9341159	LI/NE/NYC	9312569
FULL FACE	6" 150#		9332599	LI/NE/NYC	9312568
FULL FACE	8" 150#		9341168	LI/NE/NYC	9315689
FULL FACE	12” 150#		9333145	LI/NYC	
RING	2” 150#		9341161	LI/NE/NYC	9321894
RING	3” 150#		9341162	LI/NE/NYC	9321893
RING	4” 150#		9341160	LI/NE/NYC	9321376
RING	6” 150#		9341163	LI/NE/NYC	9321386
RING	6" 300#		9341167	LI/NE/NYC	
RING	8” 150#		9341164	LI/NE/NYC	9321387
RING	10” 150#				9309412
RING	12” 150#		9341165	LI/NYC	9321388
RING	16” 150#				9321971 RI
RING	20” 150#		9341165	LI/NYC	9321988 UNY

TABLE 6 – LIST OF CAP SCREWS FOR METERS AND PLUG VALVES

ITEM	SIZE	ORACLE ITEM ID	LOCATION	PEOPLESOFT UNY / RI
CAP SCREW	5/8” X 1-1/2”	9342412	LI/NYC	9304789 SS RI ONLY
CAP SCREW	5/8” X 1-3/4”			9315950 SS
CAP SCREW	5/8” X 2”	9342411 FOR ROTARY METERS	LI/NYC	9304781 SS
CAP SCREW	¾” X 2”	9342387 FOR 6” PLUG VALVES	LI/NYC	
CAP SCREW	¾” X 2-1/4”	9342388 FOR ROTARY METERS	LI/NYC	
CAP SCREW	7/8” X 2-1/2”	9342410 FOR 10” PLUG VALVES	LI/NYC	

TABLE 6 – LIST OF BOLTS

BOLTS	SIZE	DESCRIPTION	ORACLE ID LI / NYC ONLY	PEOPLESOFT UNY / RI	LOCATION
MACHINE BOLT	1/2" X 2"	HEX HEAD NUTS SUPPLIED WITH ORACLE ITEMS NUTS ARE SUPPLED SEPARATELY WITH PEOPLESOFT ITEMS ALL BOLTS ARE PER A-193 B7 AND NUTS PER A-194	9339768		
MACHINE BOLT	1/2" X 2-1/2"		9339773		
MACHINE BOLT	3/4" X 3"			9307782	RI
MACHINE BOLT	3/4" X 3-1/4"		9339767	9310612	RI
MACHINE BOLT	3/4" X 3-1/2"			9310618	RI
MACHINE BOLT	3/4" X 3-3/4"		9328771		
MACHINE BOLT	3/4" X 4"		9339770	9310617	RI
MACHINE BOLT	3/4" X 4-1/2"		9328772	9307781	RI
MACHINE BOLT	3/4" X 6"			9310609	RI
MACHINE BOLT	5/8" X 2-1/4"			9306269	RI
MACHINE BOLT	5/8" X 2-1/2"			9310611	RI
MACHINE BOLT	5/8" X 2-3/4"		9339766	9310616	RI
MACHINE BOLT	5/8" X 3"		9339769	9310623	RI
MACHINE BOLT	5/8" X 3-1/4"			9310615	RI
MACHINE BOLT	5/8" X 3-1/2"		9339774	9310610	RI
MACHINE BOLT	5/8" X 4"		9328062		
MACHINE BOLT	5/8" X 5"			9307758	RI
MACHINE BOLT	7/8" X 4"		9339771	9310613	RI
STUD BOLT	3/4" X 4-3/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9328768		
STUD BOLT	3/4" X 4"	PER A-193 GRADE B7 W/NUTS PER A-194		9312367	UNY
STUD BOLT	3/4" X 5"	PER A-193 GRADE B7 W/NUTS PER A-194	9325631	9311034	UNY
STUD BOLT	3/4" X 6"	PER A-193 GRADE B7 W/NUTS PER A-194	9325632		
STUD BOLT	5/8" X 3-1/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9325634	9312366	UNY
STUD BOLT	5/8" X 4"	PER A-193 GRADE B7 W/NUTS PER A-194	9325637	9312365	UNY
STUD BOLT	7/8" X 4-3/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9325638		
STUD BOLT	7/8" X 5-1/2"	PER A-193 GRADE B7 W/NUTS PER A-194	9325639	9312372	UNY
STUD BOLT	7/8" X 5-1/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9325640		
STUD BOLT	7/8" X 6"	PER A-193 GRADE B7 W/NUTS PER A-194	9325641		
STUD BOLT	1" X 6"	PER A-193 GRADE B7 W/NUTS PER A-194	9328704	9312371	UNY
STUD BOLT	1" X 7"	PER A-193 GRADE B7 W/NUTS PER A-194	9328705	9312370	UNY
STUD BOLT	1-1/8" X 6-3/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9328701		
STUD BOLT	1-1/8" X 7"	PER A-193 GRADE B7 W/NUTS PER A-194		9312364	UNY
STUD BOLT	1-1/8" X 7-1/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9328703		
STUD BOLT	1-1/8" X 8"	PER A-193 GRADE B7 W/NUTS PER A-194	9328702		
STUD BOLT	1-1/4" X 7-1/4"	PER A-193 GRADE B7 W/NUTS PER A-194	9328699		
STUD BOLT	1-1/4" X 7-3/8"	PER A-193 GRADE B7 W/NUTS PER A-194	9328700		
STUD BOLT	1-1/2" X 8"	PER A-193 GRADE B7 W/NUTS PER A-194		9312369	UNY
STUD BOLT	1-1/2" X 9-1/2"	PER A-193 GRADE B7 W/NUTS PER A-194	9328698	9312368	UNY

TABLE 7 – LIST OF BOLTS (NEW ENGLAND INVENTORY)

BOLTS	SIZE	DESCRIPTION (NUTS LISTED SEPARATEY)	ITEM ID	LOCATION
STUD BOLTS	5/8" X 3-1/4"	PER ASTM A193 GRADE B7 11 THREADS/INCH	9325086	NE
STUD BOLTS	5/8" X 3-1/2"	PER ASTM A193 GRADE B7 11 THREADS/INCH	9325019	NE
STUD BOLTS	5/8" X 5-1/2"	PER ASTM A193 GRADE B7 11 THREADS/INCH	9325079	NE
STUD BOLTS	5/8" X 5-3/4"	PER ASTM A193 GRADE B7 11 THREADS/INCH	9325084	NE
STUD BOLTS	3/4" X 4"	PER ASTM A193 GRADE B7 10 THREADS/INCH	9325078	NE
STUD BOLTS	3/4" X 6-1/2"	PER ASTM A193 GRADE B7 10 THREADS/INCH	9325087	NE
STUD BOLTS	3/4" X 7"	PER ASTM A193 GRADE B7 10 THREADS/INCH	9325075	NE
STUD BOLTS	7/8" X 4-3/4"	PER ASTM A193 GRADE B7 9 THREADS/INCH	9325020	NE
STUD BOLTS	7/8" X 8"	PER ASTM A193 GRADE B7 9 THREADS/INCH	9325080	NE
STUD BOLTS	1" X 9-1/2"	PER ASTM A193 GRADE B7 8 THREADS/INCH	9325085	NE
STUD BOLTS	1-1/8" X 11"	PER ASTM A193 GRADE B7 7 THREADS/INCH	9325088	NE
STUD BOLTS	1-1/4" X 8-1/2"	PER ASTM A193 GRADE B7 7 THREADS/INCH	9325022	NE
STUD BOLTS	1-1/4" X 12-3/4"	PER ASTM A193 GRADE B7 7 THREADS/INCH	9325021	NE
STUD BOLTS	1-1/2" X 9"	PER ASTM A193 GRADE B7 6 THREADS/INCH	9325023	NE

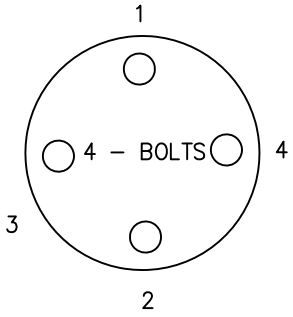
TABLE 8: BOLT TORQUE REQUIRED TO ACHIEVE 45,000 PSIG STRESS

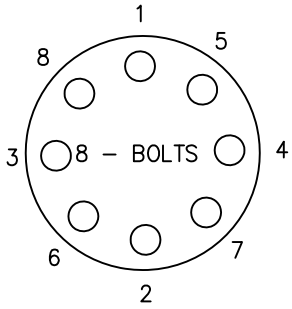
BOLT TORQUE REQUIRED IN FT - LBS			
BOLT DIAMETER	FLEXITALLIC SIGMA 511 OR KLINGER C-4401 GASKETS	FLEXITALLIC SPIRAL WOUND GASKETS	LINEBACKER, & NEOPRENE PHENOLIC GASKETS
3/8	18	18	20
1/2	20	45	40
5/8	100	90	110
3/4	175	150	150
7/8	250	240	220
1	400	368	320
1-1/8	533	533	450
1-1/4	750	750	650
1-1/2	1200	1200	1200
1-3/4	2250	2250	1750
2	3300	3300	2400

NOTE: BOLTS MUST BE LUBRICATED PRIOR TO TIGHTENING

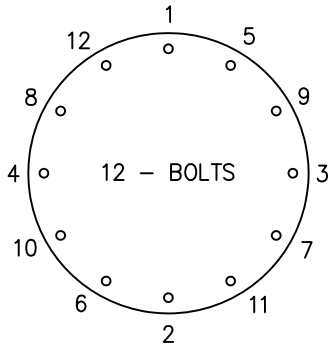
BOLT TORQUE PROCEDURES

SEQUENTIAL ORDER:
1–2, 3–4

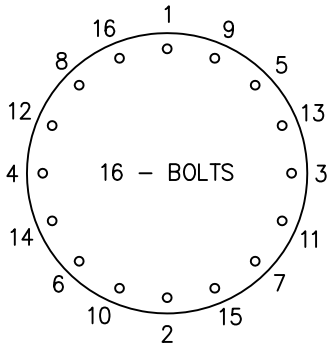




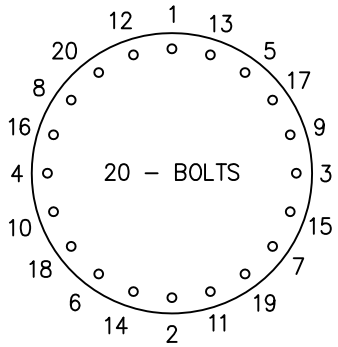
SEQUENTIAL ORDER:
1–2, 3–4, 5–6, 7–8



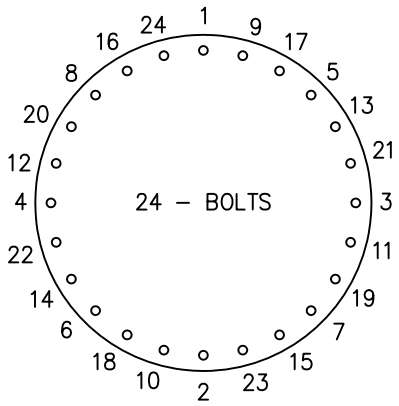
SEQUENTIAL ORDER: 1–2, 3–4, 5–6, 7–8, 9–10, 11–12



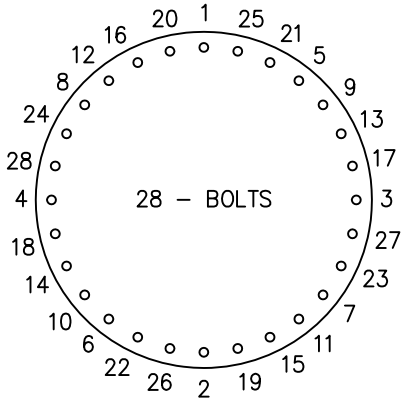
SEQUENTIAL ORDER: 1–2, 3–4, 5–6, 7–8, 9–10, 11–12, 13–14, 15–16



SEQUENTIAL ORDER: 1–2, 3–4, 5–6, 7–8, 9–10, 11–12, 13–14, 15–16, 17–18, 19–20



SEQUENTIAL ORDER: 1–2, 3–4, 5–6, 7–8, 9–10, 11–12, 13–14, 15–16, 17–18, 19–20, 21–22, 23–24



SEQUENTIAL ORDER: 1–2, 3–4, 5–6, 7–8, 9–10, 11–12, 13–14, 15–16, 17–18, 19–20, 21–22, 23–24, 25–26, 27–28

APPENDIX I

Elevated Pressure Letter Request Form

Sales Rep. : _____ **Phone :** **Date:** _____

Engineering Letter to be addressed to:

Name: _____

Firm: _____

Address: _____

City: _____

Customer: (address where the gas service/meter is located)

Customer: _____

Address: _____

City: _____

Elevated Pressure Letter Request:

Elevated Pressure Required at meter outlet: _____ inches w.c. or _____ psig

Est. Length of Piping after Meter: _____ ft.

Type of Gas Equipment: _____

Max. Fire: _____ cfh

Pressure Required at Equipment: _____ *

Type of Gas Equipment: _____

Max. Fire: _____ cfh

Pressure Required at Equipment: _____ *

Total Load Requested for Elevated Pressure: _____ cfh.

*** Attach equipment spec's showing gas pressure required.**

Comments:

Natural Gas Booster Letter Request Form

Rev. 12/00

Sales Rep. : Richard McLaren **Phone : 617-719-4308** **Date: _____**

Approval Letter to be addressed to:

Name: _____

Firm: _____

Address: _____

City: _____

Address where the gas booster is to be installed:

Customer: _____

Address: _____

City: _____

Booster Letter Request Information:

Gas Booster 1

Gas Equipment operating pressure: _____

Gas Equipment: Htg, WH, CK, Drying, Process, Cogen, Em. Gen, CNG, Other.

Total load requested for boosting pressure: _____ cfh.

Booster: Brand name: _____

Model #: _____

Add _____ " w.c. or _____ psig, rated at _____cfh.

Gas Booster 2

Gas Equipment operating pressure: _____

Gas Equipment: Htg, WH, CK, Drying, Process, Cogen, Em. Gen, CNG, Other.

Total load requested for boosting pressure: _____ cfh.

Booster: Brand name: _____

Model #: _____

Add _____ " w.c. or _____ psig, rated at _____cfh.

Comments:

Save money, help the environment and achieve peace of mind.

Your complete guide to converting to natural gas.

nationalgrid

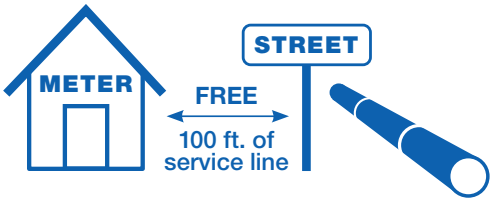
nationalgrid

UNDERSTANDING YOUR OPTIONS

Determine the availability of gas in your neighborhood.

Getting started is as simple as a phone call. Before you begin the conversion process, it's important to determine how far away your home is from the natural gas line. Call **1-877-MyNGrid** (877-696-4743) and we will analyze the availability of gas in your area.

National Grid will provide up to 100 feet of service line from the meter location to the street. If additional service is required, National Grid will provide a quote free of charge.



If natural gas is not in front of your house, National Grid can provide a quote to extend the main to your house. Please share the information with neighbors as it may decrease the cost. If any additional main or service line is required, we will provide a quote free of charge. **Please use the information sheet on the last page to help get your neighbors on board so you can all get natural gas.**

Let us help you select a plumber.

It's important to work with a qualified, licensed plumbing and heating professional when converting your home to natural gas. **And, National Grid can make it easy.**

- If you have already selected a plumber, contact them directly to start the conversion process.
- Or, call **1-877-MyNGrid** to request contact information for one or more of our National Grid Value Plus Installers.

nationalgrid® Value Plus Installer

Choosing the right equipment for your home.

Now that you've selected a plumber, you will work with them to select the optimal heating system. Explore all options with your plumber to design the best system for your home.

Asking the right questions to design your system.

Use the **Questions to Ask Your Plumber** quick reference guide to help you get the most out of your discussion.

Rebates can open up even more options.

We provide valuable incentives and rebates on high-efficiency equipment to make it easier for your family to save, year-in and year-out. View the **Eligible Heating Equipment and Pricing List** which includes a listing of available incentives and rebates.

Keeping you on track.

Use the **Conversion Checklist** to mark all the steps that you complete.

CONVERTING YOUR HOME

Submit the Residential Gas Service Agreement and get started.

Now that you have selected your plumbing and heating professional, and understand your options and costs, it's simple to get the conversion process underway.

Print the **Residential Gas Service Agreement** form and working with your plumber, fill it out and email it to **NESales@nationalgrid.com** or fax it to **315-460-9033**.
You may also mail it to: National Grid, 40 Sylvan Rd, Waltham, MA 02451
Attn: Gas Connections

Additional Service Line Charges: If your home requires greater than 100 feet of service, National Grid will send you an invoice (quote).

Timing of your job.

Service Line Installation (gas is on your road): Depending on project scope may take 8-12 weeks.
Gas Main and Service Line Installation: Depending on project scope may take between 16-24.
** If you live on a state or county road, permits may take an additional 12 weeks to the time line above.*

Energy-efficiency heating and control rebates.

We offer rebates on qualifying energy-efficiency equipment for residential, commercial, and multifamily gas heating customers. Installing high-efficiency equipment helps you reduce energy usage, lower your energy bills and ensure a cleaner, "greener" future!

Go to **ngrid.com/ma-rebates** to submit your rebate applications online or print and mail. Customers who do not have online access can call **1-877-316-9491** to receive an energy efficiency rebate application.

Your home's conversion is now underway.

This is what you should expect to happen:

1. National Grid will review your application, design your project, apply for road opening permits, and provide you with an estimated installation date.
2. National Grid will install the gas service line to your home then loom and seed any excavated lawn areas.
3. Your plumber will install your new heating equipment.
4. Your plumber will schedule an inspection with your local municipality.
5. Call Customer Service at **1-800-732-3400** to schedule their meter install.

To better understand what you must do during the rest of this process, please review the **Roles & Responsibilities** quick reference guide.

REAPING THE REWARDS

Congratulations!

Now that you have converted to natural gas you are benefiting from:

- **the tremendous price advantage compared with heating oil to cut utility bills,**
- **lower CO_2 emissions to preserve the planet,**
- **greater reliability and convenience,**
- **less soot for a cleaner home.**

Don't stop there – take advantage of these valuable incentives.

Claim applicable rebates and rewards by:

- **Visiting ngrid.com/ma-rebates to submit your rebate applications online or print and mail. Customers who do not have online access can call 1-877-316-9491 to receive an energy efficiency rebate application.**
- **If you selected a Burnham Boiler, visit conversionprogram.net clicking on "Register My Owner Rebate" and using your Order Number provided by your plumber, as well as your equipment model and serial number.**

THAT'S IT! Your home is now energy efficient and saving you money!

QUESTIONS? National Grid will be right beside you every step of the way.
If you have any questions, please contact us at: **1-877-MyNGrid**.

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ROLES & RESPONSIBILITIES

Working together, we can make this process easy and rewarding.

National Grid's responsibility:

- Reviewing your application
- Designing your project
- Applying for the necessary permits from your municipality to excavate on your street and property
- Providing you with an estimated installation date once the permits have been received
- Installing the gas service line to your home
- Loom and seed (MA only)
- Temporarily patching the road to make the excavation area safe
- Installing your home's gas meter
- Performing final road restoration (weather permitting)

The plumber's responsibility:

- Correctly size the best heating system for your home
- Provide quote for their work
- Install gas equipment
- Contact National Grid to schedule and meter set appointment at **1-800-732-3400**

Your responsibility:

- Obtain a plumber
- Work with your licensed plumber to complete and submit a Residential Gas Service Agreement form, see page 8 or online. Fill in all highlighted areas.
- Do not remove any of your current heating, hot water or cooking appliances. Until gas line has been completely installed onto the property.
- Send in a payment (if applicable)
- Cancel your oil delivery when new equipment and meter are installed

QUESTIONS? National Grid will be right beside you every step of the way.
If you have any questions, please contact us at: **1-877-MyNGrid**.

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QUESTIONS TO ASK YOUR PLUMBER

Explore all options to design the best system for your home.

What type and size equipment will I need?

(A heat load analysis is the best way to determine the type and size of equipment needed.)

Is a Conversion Burner an option?

Can I install high-efficiency equipment?

Will I need to install a chimney liner?

What options do I have for my existing oil tank after I convert?

What equipment venting options do I have?

When should I cancel my oil delivery?

QUESTIONS? National Grid will be right beside you every step of the way.

If you have any questions, please contact us at: **1-877-MyNGrid**.

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CONVERSION CHECKLIST

Track your progress to ensure that you complete all conversion steps.

- [ ] Called National Grid to determine the availability of natural gas.
- [ ] Selected a qualified, licensed plumber.
- [ ] Worked with my plumber to select equipment.
- [ ] Submitted the Residential Gas Service Agreement Form to National Grid.
- [ ] Ordered equipment through my plumber.
- [ ] Paid additional service line charges (if applicable).
- [ ] Called Customer Service at **1-800-732-3400** to schedule the meter installation.
- [ ] Submit manufacturer rebate (if applicable).
- [ ] Submitted the high-efficiency rebate application (if applicable).
- [ ] Cancelled oil deliveries.

QUESTIONS? National Grid will be right beside you every step of the way.
If you have any questions, please contact us at: **1-877-MyNGrid**.

EE7671 MA (1/20)

Massachusetts and Rhode Island Eligible Residential Heating Equipment and Pricing

nationalgrid

Offer effective:
January 2020 - March 31, 2020

National Grid requires contractors to supply customers with the most efficient equipment models available for their home. **All Equipment is required to be ordered online at www.conversionprogram.net** The latest equipment price is available online.

BURNHAM HE COMBI & HEATING BOILERS	Model #	Input	AFUE	Equipment Price	MA Upcharge 6.25% Tax Included	RI Upcharge 7.0% Tax Included	Manufacturer Visa Rebate Card	MA EE Mail-In Rebates	RI EE Mail-In Rebates
K2 Water Tube Combi	K2WTC-135B-6T00 Combi	120,000	95.0%	$1,710.13	$1,817.01	$1,829.84	$400.00	$2,400	$1,200
	K2WTC-180B-6T02 Combi	180,000	95.0%	$2,074.61	$2,204.27	$2,219.83	$400.00	$2,400	$1,200
Aspen Fire Tube Combi	ASPNC-155A-6LT00 Combi	155,000	95.0%	$2,914.22	$3,096.36	$3,118.22	$300.00	$2,400	$1,200
K2 Series Condensing Water Tube 10:1	K2WT-080B-6T00	80,000	95.0%	$1,737.36	$1,845.95	$1,858.98	$300.00	$2,750	$800
	K2WT-100B-6T00	100,000	95.0%	$1,793.51	$1,905.60	$1,919.06	$300.00	$2,750	$800
	K2WT-120B-6T00	120,000	95.0%	$1,888.76	$2,006.81	$2,020.97	$300.00	$2,750	$800
	K2WT-150B-6T00	150,000	95.0%	$2,045.17	$2,172.99	$2,188.33	$300.00	$2,750	$800
	K2WT-180B-6T02	180,000	95.0%	$2,185.59	$2,322.19	$2,338.58	$300.00	$2,750	$800
Aspen Condensing Fire-Tube 10:1	ASPN-085A-6L00M	85,000	95.0%	$2,185.41	$2,322.00	$2,338.39	$300.00	$2,750	$800
	ASPN-110A-6L00M	110,000	95.0%	$2,297.70	$2,441.31	$2,458.54	$300.00	$2,750	$800
	ASPN-155A-6L00M	155,000	95.0%	$2,690.01	$2,858.14	$2,878.31	$300.00	$2,750	$800
	ASPN-205A-6L00M	205,000	95.0%	$3,277.97	$3,482.84	$3,507.43	$300.00	$2,750	$800
	ASPN-270A-6L00M	270,000	95.0%	$3,899.74	$4,143.47	$4,172.72	$300.00	$2,750	$800
Alpine Condensing 5:1 *Alpine 500-800 available, see Portal for Pricing*	ALP080BW-4T02	80,000	95.0%	$2,544.99	$2,704.05	$2,723.14	$325.00	$2,750	$800
	ALP105BW-4T02	105,000	95.0%	$2,809.77	$2,985.38	$3,006.45	$500.00	$2,750	$800
	ALP150BW-4T02	150,000	95.0%	$3,249.81	$3,452.92	$3,477.30	$500.00	$2,750	$800
	ALP210BW-4T02	210,000	95.0%	$3,647.94	$3,875.94	$3,903.30	$600.00	$2,750	$800
	ALP285BF-4T07	285,000	95.0%	$5,044.89	$5,360.20	$5,398.03	$1,000.00	$2,750	$800
	ALP399CF-4L00	399,000	94.1%	$6,884.31	$7,314.58	$7,366.21	$600.00	$2,000	$800
BURNHAM MID-EFFICIENCY BOILERS									
Series 2 - Forced Hot Water, Natural Draft *Sizes 207-210: See Portal for Inputs / AFUE's / Pricing*	202NIL-TEI2	37,500	82.3%	$1,589.41	$1,688.75	$1,706.67	$580.00	$0	$0
	203NIL-TEI2	62,000	82.6%	$1,780.17	$1,891.43	$1,904.78	$715.00	$0	$0
	204NIL-TEI2	96,000	82.3%	$1,910.84	$2,030.27	$2,044.60	$765.00	$0	$0
	205NIL-TEI2	130,000	82.0%	$2,149.51	$2,283.85	$2,299.98	$895.00	$0	$0
	206NIL-TEI2	164,000	82.0%	$2,475.01	$2,629.70	$2,648.26	$1,050.00	$0	$0
ES2 Series - Forced Hot Water, Natural Vent *See Portal for sizes ES27-ES29 Pricing*	ES23BNI-T	70,000	85.0%	$1,865.54	$1,982.14	$1,996.13	$475.00	$0	$0
	ES24BNI-T	105,000	85.0%	$2,044.11	$2,171.87	$2,187.20	$510.00	$0	$0
	ES25BNI-T	140,000	85.0%	$2,288.10	$2,431.11	$2,448.27	$585.00	$0	$0
	ES26BNI-T	175,000	85.0%	$2,612.90	$2,776.21	$2,795.80	$695.00	$0	$0
ESC Series - Forced Hot Water, Sealed Combustion *See Portal for ESC7 - ESC9 Pricing*	ESC3NI-TS	60,800	85.5%	$2,110.95	$2,242.88	$2,258.72	$705.00	$0	$0
	ESC4NI-TS	91,200	85.4%	$2,240.06	$2,380.06	$2,396.86	$695.00	$0	$0
	ESC5NI-TS	121,600	85.3%	$2,484.04	$2,639.29	$2,657.92	$765.00	$0	$0
	ESC6NI-TS	152,000	85.2%	$2,808.80	$2,984.35	$3,005.42	$820.00	$0	$0
Independence Series - Steam Natural Draft	PIN4SNI-HE2	105,000	82.0%	$2,393.16	$2,542.73	$2,560.68	$925.00	$0	$0
	PIN5SNI-HE2	140,000	82.0%	$2,743.77	$2,915.26	$2,935.83	$1,075.00	$0	$0
	PIN6SNI-HE2	175,000	82.1%	$3,089.56	$3,282.66	$3,305.83	$1,210.00	$0	$0
	PIN7SNI-HE2	210,000	82.1%	$3,399.09	$3,611.53	$3,637.03	$1,335.00	$0	$0
Independence INPV Series - Steam, Power Vented	IN3PVNI-M2	62,000	83.2%	$2,229.52	$2,368.87	$2,385.59	$605.00	$0	$0
	IN4PVNI-M2	105,000	82.2%	$2,573.69	$2,734.55	$2,753.85	$690.00	$0	$0
	IN5PVNI-M2	140,000	82.2%	$3,009.77	$3,197.88	$3,220.45	$810.00	$0	$0
	IN6PVNI-M2	175,000	82.2%	$3,382.98	$3,594.42	$3,619.79	$915.00	$0	$0
AMERICAN STANDARD EQUIPMENT									
Furnace Standard Equipment	S8X1B040M2PSAA	40,000	80.0%	$521.00	$553.56	$557.47	N/A	$0	$0
	S8X1B060M3PSAA	60,000	80.0%	$560.00	$595.00	$599.20	N/A	$0	$0
	S8X1B080M4PSAA	80,000	80.0%	$598.00	$635.38	$639.86	N/A	$0	$0
	S8X1C100M5PSAA	100,000	80.0%	$637.00	$676.81	$681.59	N/A	$0	$0
	S8X1D120M5PSAA	120,000	80.0%	$658.00	$699.13	$704.06	N/A	$0	$0
Furnace Ultra-High Efficiency Equipment with Electronically Commutated Motor	S9X1B040U3PSBA	40,000	97.0%	$1,301.00	$1,382.31	$1,392.07	N/A	$1,250	$500
	S9X1B060U4PSBA	60,000	97.0%	$1,378.00	$1,464.13	$1,474.46	N/A	$1,250	$500
	S9X1B080U4PSBA	80,000	97.0%	$1,475.00	$1,567.19	$1,578.25	N/A	$1,250	$500
	S9X1C100U5PSBA	100,000	97.0%	$1,668.00	$1,772.25	$1,784.76	N/A	$1,250	$500
	S9X1D120U5PSBA	120,000	97.0%	$1,769.00	$1,879.56	$1,892.83	N/A	$1,250	$500
Furnace High Efficiency Equipment	S9V2B040U3VSAB	40,000	96.0%	$675.00	$717.19	$722.25	N/A	$0	$0
	S9V2B060U3VSAB	60,000	96.0%	$700.00	$743.75	$749.00	N/A	$0	$0
	S9V2B080U4VSAB	80,000	96.0%	$730.00	$775.63	$781.10	N/A	$0	$0
	S9V2C100U4VSAB	100,000	96.0%	$825.00	$876.56	$882.75	N/A	$0	$0
	S9V2D120U5VSAB	120,000	95.0%	$930.00	$988.13	$995.10	N/A	$0	$0

Massachusetts

Residential Gas Service Agreement - 2020

nationalgrid

Email form to: nesales@nationalgrid.com **Fax form to:** 315-460-9033
Mail form to: National Grid, 40 Sylvan Rd., Waltham, MA 02451 **Attn:** Gas Connections (E1)

Highlighted fields MUST be completed by applicant/contractor or job cannot be processed.

Contact Information

Applicant Name: _____

Premise Address: _____

City, State, Zip: _____

Mailing Address: *(if different from service address)* _____

Contact Phone: _____

Alternate Phone: _____

Email Address: _____

Contractor Name: _____

Contractor Address: _____

_____

Contractor Phone: _____

Gas Load

☐ Single family
☐ Multi family ____ # Units

Gas Equipment (Please indicate below if equipment is Existing = **E** or New = **N**)

____ Individual meters ____ Heating ____ Generator
____ Heat ____ Water Htg. ____ Grill
____ Non-heat ____ Cooking ____ Light
____ House meter ____ Drying ____ Pool Htr.
____ Single meters ____ Fireplace ____ Garage Htr.

Planned Equipment installation date _____ / _____ / _____

Framing complete date (New Construction):_____

	Unit	BTU/HR	Heating BTU	Rate	Mtr. Size
Mtr. 1		0			
Mtr. 2		0			
Mtr. 3		0			
Mtr. 4		0			
Mtr. 5		0			
TOTAL		0			

This agreement is subject to the **Terms and Conditions on the back of this agreement**. Boston Gas Company d/b/a National Grid, Colonial Gas Company d/b/a National Grid and Essex Gas Companyd/b/a National Grid (National Grid) agrees to install a gas service to the above location (Premises). I understand that I may cancel this agreement, without obligation, at anytime prior to the installation of the gas service line. I hereby authorize National Grid to install a natural gas service line to the address noted above.

In the event that the gas equipment identified in this agreement is not installed and in use within six months of the date of installation of the service line, the Applicant agrees to pay National Grid for the cost of installing all gas lines necessary to serve Premises, minus any prior contribution in aid of construction made to National Grid. _____ (initial)

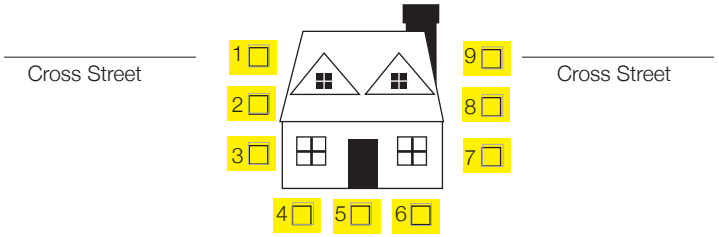
Owner/Applicant Signature: _____ **Date:** _____

Contractor Signature: _____ **Date:** _____

Site Information

Surrounding Area: ☐ Wetlands/water ☐ Undeveloped ☐ Public Road ☐ Historic ☐ Urban ☐ Private Roadway ☐ Nature Preserve

☐ Corner Lot
(Please mark for meter location and indicate street and cross street names)



House square footage: _____

Mtr. location #: _____ Distance of house to street: _____

Distance from front (____ right ____ left) corner of house: _____

Connection from (Street Name): _____

Parking restrictions: _____

Conditions on private property along proposed service route (check all that apply):

☐ Wall ☐ Flower Beds ☐ Walkway ☐ Driveway
☐ Sprinkler ☐ Septic (incl. plan) ☐ Trees ☐ Ledge/Rock
☐ Underground electric/phone/cable ☐ Underground Oil Tank
☐ Waterline ☐ None of the above

Project Information

Type: ☐ New Construction ☐ Existing House w/Gas ☐ Existing House No gas ☐ Existing House with unused gas line

Work Requested (check all that apply):

☐ New Service Line ☐ Modify service
☐ Additional meters ☐ Upgrade meter(s)

Trenching by National Grid: ☐ Yes ☐ No

Existing Service Info (if applicable):

Service Size _____ Meter Riser Size _____
Existing meter location ☐ Inside ☐ Outside

Customer contribution:* $_____
*Customer quote is valid for 90 days from the date this Agreement is sent to the customer. After 90 days, this amount is no longer valid and is subject to change.

Target Date: _____ **All grey shaded areas are for company use**

Target/Comp ID: _____

Work Order #: _____ _____ Easement

Permits: ☐ Town ☐ State ☐ Conservation ☐ Private Road

Describe work requested:

_____

_____

Reviewed by: _____ **Date:** _____

Terms and Conditions of Residential Gas Service Agreement

1. Applicant agrees to pay National Grid to aid in the construction of the natural gas service line and associated main work required to provide service to the Premises. In the event that the actual service line length exceeds the estimated footage, National Grid may bill the property owner at a rate of (Excess Footage Fee) over the estimated service line length.

2. Once the meter is set, the Applicant becomes the customer of record and National Grid will commence billing the Applicant. The Applicant agrees to pay for gas service pursuant to the applicable rate classification and in accordance with National Grid's Terms and Conditions, as filed from time to time with the Massachusetts Department of Public Utilities.

3. National Grid will take reasonable measures to minimize damage to Applicant's property. For existing structures, National Grid will loam and reseed excavated areas and patch disturbed asphalt. Applicant is responsible for maintaining all reseeded areas.

4. National Grid will install the necessary natural gas distribution system to the site, subject to weather conditions and all federal, state and local codes and permit requirements.

5. Notwithstanding the foregoing, National Grid may, at any time, terminate this Agreement without any further obligations, in the event of one of the following "Triggering Conditions": (a) it discovers that there is no active natural gas main in close proximity to Applicant's property for which a service connection can be made in a reasonably cost effective manner (b) it discovers conditions (including, without limitation, ledge, steep grades, and retaining walls), that would, in National Grid's judgment, materially increase the cost of installation, or (c) the fees for the required permits are significantly in excess of what is typical for such work (d) National Grid is unable to obtain the necessary permits to install the gas service line. In the event of a Triggering Condition, National Grid shall consider any Applicant proposals for an adjustment of price.

6. National Grid will not be responsible for delays or damages associated with the installation of a gas service line due to weather or the issuance of permits, nor will it be responsible for damages attributable to unforeseen conditions beyond its control.

7. (New Construction Only) Applicant shall construct, or cause the construction of all necessary water lines, sewer lines, roads and electrical lines, and will perform other necessary work required to prepare the site for the installation.

8. Applicant shall provide all easements and rights-of-way necessary for National Grid to install natural gas distribution lines required to provide service to the Premises.

9. National Grid will accept or modify the meter location shown on the front of this form based upon its installation requirements.

10. Applicant assumes full and complete responsibility for any and all costs associated with any environmental contamination encountered by National Grid during the installation, including but not limited to the costs to clean up or remediate such contamination, provided that this provision shall not apply to environmental contamination caused by any employee, contractor, agent, or representative of National Grid.

11. In the event that environmental contamination is encountered during the installation, all work shall cease and National Grid shall provide oral and written notice to the Applicant within a reasonable time. Thereafter, National Grid shall have no further obligations under this agreement, provided that this provision shall not apply to environmental contamination caused by any employee, contractor, agent, or representative of National Grid.

12. Applicant shall, to the fullest extent permitted by law, indemnify, hold harmless and release National Grid, its parent company, affiliates and subsidiaries and their respective directors, officers, employees, agents, servants, representatives, successors and assigns from and against all claims, demands, liabilities or expenses related to environmental contamination at or in the vicinity of the Premises, provided that this provision shall not apply to environmental contamination caused by any employee, contractor, agent, or representative of National Grid. This indemnity and release provision survives the expiration or termination of the Agreement and extends to the respective successors and assigns of National Grid and Applicant.

13. National Grid shall own the natural gas distribution system up to the outlet side of each individual customer meter.

14. All installations where excavating and back filling are to be performed by Applicant or his/her designee will be performed in compliance with National Grid's specifications, and the installation shall not commence until said trench is inspected and accepted by a representative of National Grid.

15. In the event that the gas equipment identified on the front of this agreement is not installed and in use within six months of the date of installation of the service line, the Applicant agrees to pay National Grid for the cost of installing all gas lines necessary to serve Premises, minus any prior contribution in aid of construction made to National Grid.

16. Prior to the start of the work described on the front of this agreement, Applicant is responsible for marking out any underground facilities on their property that are not marked out as a result of National Grid's notification of the Dig Safe system.

17. This Agreement may be modified only by a writing signed by National Grid and Applicant; any verbal representations or modifications by National Grid employees or others shall be null and void.

18. The laws of the Commonwealth of Massachusetts shall govern this Agreement.

19. If any terms of this Agreement or portions thereof are declared or become invalid or unenforceable, the remainder of this Agreement shall continue in full force and effect.

20. *Customer quote is valid for 90 days from the date this Agreement is sent to the customer. After 90 days, this amount is no longer valid and is subject to change.