SECTION 23 1123

FACILITY NATURAL-GAS PIPING

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

LANL MASTER SPECIFICATION SECTION

Word file at <https://engstandards.lanl.gov/specs.shtml>

|  |
| --- |
| Rev. 5 Summary of changesRequired NFPA 54, revised testing requirements (3.1), clarified code break point, referenced 01 4115 Pressure Safety Submittals. |

This Section is applicable to natural gas systems from the exit of the service meter assembly (or, where no meter is provided, the outlet of the service regulator or service shutoff valve). Items before and including the low-pressure manifold are to be installed per 33 5100 Natural Gas Distribution.

Harmonize with Section 01 4115, *Pressure Safety Submittals,* because facility natural gas piping has been incorporated into ESM Chapter 17, *Pressure Safety*, as required by 10 CFR 851 Appendix A 4, Pressure Safety, paragraph (b) (2) “The strictest applicable state and local codes.” NM and LANL (ESM Ch. 16) require UPC and UMC that invoke NFPA 54.

This template must be edited for each project.  In doing so, specifier must add job-specific requirements.  Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.  Once the choice is made or text supplied, remove the brackets.  The specifications must also be edited to delete specification requirements for processes, items, or designs that are not included in the project -- and specifier’s notes such as these.  This specification template is written to meet requirements contained in the LANL Engineering Standards Manual (ESM).

To seek a variance from requirements of the ESM that are applicable, contact the Engineering Standards Manual Mechanical[POC](https://engstandards.lanl.gov/POCs.shtml#mech). Please contact POC with suggestions for improvement as well.

When assembling a specification package, include applicable Sections from all Divisions, *especially Division 1, General requirements.*

This Section template was developed for ML-4 projects.  For ML-1, 2, and 3 applications, additional requirements and independent reviews should be added if increased confidence in procurement or execution is desired; see ESM Chapter 1 Section Z10 Specifications and Quality sections. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PART 1 GENERAL

* 1. SECTION INCLUDES
1. Building gas piping system (above grade) downstream of the site low pressure gas regulator station.
	1. RELATED SECTIONS
2. 01 4115, *Pressure Safety Submittals*

1.3 SUBMITTALS

1. Submit the following in accordance with project submittal procedures:
2. Catalog data on pipe materials, pipe fittings, valves, [pipe coating], and accessories.
3. [Sustainable Design (LD) Submittals: Comply with requirements specified in individual specification sections]
4. [Section 01 81 13 - *[LEED v4 and] Guiding Principles 2020*: Requirements for water efficiency, energy efficiency, material composition, and indoor air quality requirements]
5. Per the requirements of 01 4444, *Offsite Welding and Joining Requirements* and​/or 01 4455, *Onsite Welding and Joining Requirements*, submit to this Section:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

When Offsite only, delete submittals below regarding Onsite welding. For high-risk applications such as ML‑1 or ML‑2, add submittals for "Weld Filler Material Control Procedures" and "Filler Material Certified Material Test Reports (CMTRs)" when required. Add "Post‑Weld Heat Treatment Procedures" when required.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

* 1. Welding Procedure Specification (WPS) and supporting Procedure Qualification Record (PQR). [Note: For Onsite welding use of LANL WPS​/PQR is the default; coordinate usage with the LANL CWI; no submittal required]
	2. Welder Performance Qualification Records (WPQR) including continuity [Note: For Onsite, welders are tested by LANL who will produce WPQR and track continuity; this includes brazing, bonding, and fusing; no submittal required]
	3. Inspector qualification records
	4. Inspection procedures
	5. Weld inspection report(s) and weld map(s)

1.4 QUALITY ASSURANCE

1. Welders Certification and Qualified Procedure Standards
2. Interior Steel Pipe: Section IX of ASME Boiler and Pressure Vessel Code.
3. Perform work per NFPA 54.

PART 2 PRODUCTS

* 1. PRODUCT OPTIONS AND SUBSTITUTIONS
1. Alternate products may be accepted; follow Section 01 2500, *Substitution Procedures.*

2.2 STEEL PIPING, ABOVE GRADE

1. Pipe: Standard wall, black steel, ASTM A53, Type [E] [S], Grade B. Welded for pipe sizes above 2 inches, threaded for pipe sizes 2 inches or less.
2. Pipe Fittings: Standard weight
3. For pipes 2 inch and smaller: Malleable iron, black steel threaded type, ASME B16.3, ASTM A197
4. For pipes greater than 2 inches: Factory made wrought steel butt welding type, ASME B16.9, ASTM A234, Grade WPB.
5. Flanges: Steel, weld neck, class 150, raised face, ANSI B16.5.
6. Gasket Material: Neoprene, durometer hardness 50-65.

2.3 PLUG VALVES, ABOVE GRADE

1. Valve: Iron body, Female Iron Pipe (FIP) threaded ends or flanged ends to suit piping, plug style, flat head wrench operated, 100 psig working pressure.
	1. Isolation Valves, Above grade
2. Manufacturer​/Model: NIBCO T‑560‑CS‑R‑25‑FS‑LL
3. Valve: Carbon steel, female threaded ends or flanged ends to suit piping, reduced port, blowout‑proof stem, vented ball, fire safe and maximum rated for 2,000 psig, MSS SP‑110.

2.4 TEST PLUG (PETE’s PLUG)

1. Size 1/4-inch NPT, brass body, neoprene core, rated for 1,000 psig, complete with sealing cap and gasket, to receive 1/8-inch O.D. probe.

PART 3 EXECUTION

3.1 INSTALLATION

1. Furnish and install gas piping per NFPA 54 as applicable.
2. Do not run gas piping below buildings, structures, or in crawl spaces. Gas piping installed on the roof shall be elevated above the roof surface and supported.
3. Do not run gas piping under walks and equipment pads adjacent to building. If this is unavoidable, sleeve line and vent as required.
4. Install piping to conserve building space and coordinate installation with other trades to optimize the space for all services. Provide clearance for access to valves and fittings.
5. Install piping in mechanical rooms parallel to or at right angles to the building walls.
6. Pressure test piping in accordance with Section 22 0813, *Testing Piping Systems,* for the pressures and durations listed below:
	* + 1. Operating Pressure up to 14 inches w.c.: Test with inert gas at 10 psig for [15] minutes.
			2. Operating pressure higher that 14 inches w.c.: The test pressure shall be not less than 60 psig for [30] minutes with inert gas.
7. Label piping in accordance with Section 22 0554*, Identification for Plumbing, HVAC, and Fire piping and Equipment*.
8. [Paint outside gas regulator piping, valves, and appurtenances above ground to match building exterior. Refer to Section 09 9100, *Painting.*]
9. Support piping in accordance with Section 22 0529, *Hangers and Supports for Plumbing Piping and Equipment.*
10. Use threaded joints for above grade piping 2 inches and smaller and butt-welded joints for piping above 2 inches.
11. Sleeve and caulk pipes penetrating exterior walls or interior bearing walls. Provide waterproof installation for exterior walls. Provide UL/FM approved through-penetration firestop system when penetrating fire-rated barriers (e.g., walls, floors, etc.), [See Section 07 8400 – *Firestopping.*]
12. Natural Gas pipe purging requirements:
13. Purged fuel gases shall be directly vented to a safe location outdoors, away from personnel and ignition sources.  This may be accomplished through permanent piping or temporary piping or hosing.
14. If it is not possible to vent purged gases outdoors, the following conditions must be met:
	1. Purging activity must be approved by the LANL Fire Marshal based on a documented justification detailing why outdoor venting is not possible and Integrated Work Document (IWD).
	2. Gas concentration in the space to which the purge is vented shall be maintained at no more than 25% of the Lower Explosive Limit (LEL). For natural gas, the LEL is a concentration of 5% in air or 50,000 ppm. Therefore, a maximum concentration of 12,500 ppm is allowed for natural gas. The concentration may be controlled by providing adequate ventilation or by limiting the amount of purge gas.
	3. Combustible gas detectors shall be used during the purging operation to monitor the gas concentration.
	4. Non-essential personnel shall be evacuated from the vicinity (including adjacent spaces) during the purging operation.
	5. Ignition sources in the purging space shall be controlled or eliminated.

END OF SECTION

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Do not delete the following reference information:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

THE FOLLOWING STATEMENT IS FOR LANL USE ONLY

This project specification section is based on LANL Master Specification Section 23 1123 Rev. 5, dated January 10, 2023.