

**TECHNICAL SPECIFICATION FOR 1/2 CTS THROUGH 8 IPS
LYCO® ANODELESS GAS SERVICE RISERS**

DIVISION I - GENERAL REOUIREMENTS

101. SCOPE

This specification covers LYCO® Anodeless Risers manufactured by R.W. Lyall & Company, Inc.

Steel Thread Outlets NPT	Plastic Pipe Inlet
3/4", 1"	1/2 CTS (5/8" O.D.)
3/4", 1"	1/2 IPS
3/4", 1"	3/4 CST (7/8" O.D.)
3/4", 1"	3/4 IPS
3/4", 1", 1-1/4"	1 CTS (1-1/8" O.D.)
3/4", 1", 1-1/4"	1 IPS
3/4", 1", 1-1/4"	1-1/4 CTS (1-3/8" O.D.)
3/4", 1", 1-1/4", 2"	1-1/4 IPS
2"	2 IPS
3"	3 IPS
4"	4 IPS
6"	2 IPS
2"	6 IPS
8"	8 IPS

The LYCO® anodeless riser requires no cathodic protection. The application of this riser is to connect any of the above plastic pipe sizes with polyethylene 2406 and 3408 materials to the corresponding sized aboveground iron pipe sizes (i.e. MSA). Risers are to be used for the distribution of natural gas (methane) or liquid propane gas only.

102. DEFINTTIONS

The terms “approve”, “as approved”, “satisfactory”, “equal to”, or similar terms wherever used in this specification shall refer to meeting or exceeding any applicable codes as documented by the standards set forth by the associations listed under the following section of this report (“REFERENCES”).

103. REFERENCES

The following references are applicable to the design, manufacture, and testing of risers included in this specification, and shall form part of this specification to the extent specified herein.

All references to the following publications are to the latest issue of each, together with the latest additions and/or amendments thereto. References to the sponsoring agencies will be made in accordance with the abbreviations indicated:

DOT ----- Department of Transportation
AISI ----- American Iron and Steel Institute
ANSI ----- American National Standards Institute
API ----- American Petroleum Institute
ASTM----- American Society for Testing ;and Materials
CFR ----- Code of Federal Regulations
OPSO ----- Office of Pipeline Safety Operations
RWLC ----- R. W. Lyall & Company, Inc. manufacturing policies and Procedure
Manual
CSA ----- Canadian Standards Association
IAPMO ----- International Association of Plumbers and Maintenance Officials

104. SHIPPING

All riser shipments shall be adequately prepared for shipment for enclosed van type truck lines. Risers will be packaged in bundles of 4 to 12 risers in each bundle according to size. Straight 2” and larger risers will be palletized. All bundles and palletized risers will be steel banded and braced to pallets, and will not shift or slide under normal shipping conditions. All inlets and outlets of risers will be capped to prevent internal contamination and thread damage. Proper cardboard and plastic wrap packaging material will be used to protect riser coatings.

104.1 PROTECTIVE COATINGS PRESERVATIVES

Protective coatings used on components will be suitable for the conditions normally expected during shipping and storage.

104.2 STORAGE

Risers may be kept in storage either inside or outside. Temperature extremes of storage environment not to exceed the limits of +120°F to -40°F. Duration of storage of risers not to exceed 1 year when stored outside, and 2 years when stored inside. Refer to polyethylene pipe manufacturers suggested storage specifications for further polyethylene pipe storage information. During storage, maintain risers in a corrosion free environment.

104.3 HANDLING

Upon distribution of risers from warehouse to project sights, risers should be handled so as not to damage protective pipe coatings. End caps and plugs should remain in place to prevent internal contamination when in transit and upon installation.

105. QUALITY ASSURANCE

LYCO® anodeless risers have been tested and manufactured to satisfy all applicable DOT, ANSI, and ASTM specifications set forth as qualifications for use in natural gas distribution systems. The risers and all accessories are designed in accordance with the current issue of Code of Federal Regulations, title 49 part 132. Qualification testing has been performed in accordance with 192.283 for heat fusion and mechanical joints. All applications and procedures will meet ASTM D-2513, Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings.

All manufacturing and testing procedures performed in the manufacturing of risers will follow all policies and procedures set forth in the RWLC manual.

106. QUALITY ASSURANCE

All anodeless risers and their component parts will be manufactured in accordance with the R.W. Lyall & Company, Inc. total quality assurance program which includes control of all quality related to the product from raw materials to shipment of finished risers.

107. CERTIFICATION

Proper certification in the form of the “Certification of Conformance” will be recorded with each shipment’s lot number and mailed with the corresponding invoice to verify that all materials conform to the requirements of the applicable codes and this specification.

DIVISION II - TECHNICAL REOUIREMENTS

201. GENERAL

LYCO® Risers will be designed especially to carry natural gas and liquid propane as specified herein. The risers shall be of the heavy-duty type suitable for continuous service. All features shall be approved and accepted by the purchasing gas utility or end user.

202. DESIGN FREEZE

The manufacturer will maintain current design drawings as approved and agreed upon by the user. These specification designs will be strictly followed and not deviated from unless specified by the user. If modifications are to be made in manufacturing of pre-designed riser, the user will be notified for approval before manufacturing.

203. DESIGN AND CONSTRUCTION

The design of the LYCO® Anodeless Risers will stay constant in sizes ranging from 1/2” CTS through 8” IPS as previously listed with variations in sizes of component parts only.

DIVISION III - COMPONENT PART SPECIFICATIONS

301. GAS CARRYING STEEL PIPE

All steel pipe used to fabricate the upper portion of the anodeless riser will be of the highest quality schedule 40 (or schedule 80 if specified) electric resistance welded steel pipe per API 5L or ASTM A-53, grade A or B specifications. All pipe will be sandblasted clean and free of chips or other contamination prior to manufacturing.

302. STEEL PIPE THREADS

All outlet threads on risers will be threaded and inspected in accordance with pipe thread specifications as specified in ANSI/AWE B 1.20.1 for NPT.

303. STEEL RISER CASING

303.1 The standard steel riser casing will be electric-resistance-welded carbon and alloy steel mechanical tubing per ASTM A 5 13.

303.2 All steel casings will be washed clean, acid etched, grit blasted, and coated. (Refer to 306 “COATING”). The outlet I.D. of each end casing will be deburred to prevent damage to the plastic gas carrier, and the lower end of each casing will be deburred to accommodate the neoprene secondary pressure seal.

304. PLASTIC PIPE

304.1 The different types of plastic available in the LYCO® risers are as follows:

<u>Polyethylene</u>	<u>Color</u>
Plexco 2406 -----	Yellow
Phillips 6500 -----	Yellow
PE 3408 Phillips Drisco M 8000 -----	Black
Plexco HD -----	Black/Yellow Stripe

304.2 These plastic pipes will only be purchased from well established, reputable, long-time producers, and will be certified by the manufacturer, inspected by quality control, and stored in accordance with RWLC standards upon delivery to R.W. Lyall & Company, Inc.

304.3 All plastic pipe used in risers will be purchased in straight lengths whenever possible. Plastic pipe will be cut squarely to appropriate lengths, and both ends will be deflashed for fusing and assembly. All pipe will be handled and assembled with care so as not to scratch

or gouge the plastic. All plastic pipe will be centered in the vertical portion of the riser with spacers so that the PE pipe does not come in contact with this portion of the casing.

305. PE TO STEEL GAS TRANSITION

305.1 LYCO® TRANSITIONS

The PE to steel LYCO® gas transition fitting will consist of a machined steel convoluted spigot, and a separate steel completion collar. This transition joint will be welded via MIG automatic welding to the above ground gas casing nipple, and will be pressure checked at 100 psi for 1 minute.

This transition will be a separate integral part assembled to the PE pipe pigtail to meet all applicable pipe joint standards, and will serve as a lifetime pressure seal and retaining joint of the PE pipe. This transition joint will be M.I.G welded into the steel riser casing to protect the transition, and to secure the gas carrying member in the upper portion of the riser casing.

306 COATING

306.1 The exterior steel casing portion of the riser will be cleaned, grit blasted, sealed,, pre-heated, and electrostatically coated with a minimum of 7 mils of #49 gray epoxy coating.

306.2 The remaining upper portion of the riser not coated with the above mentioned coating will be primed and painted with the aluminum rich urethane silver paint to resist rusting of the exposed steel nipple above ground.

306.3 LYCO® PRO-FINISH

The above ground non-epoxy coated portion of the riser may also be grit blasted and coated with 4 to 6 mils of pure aluminum flame applied powder, and sealed with aluminum rich urethane silver paint for added above ground rust resistance.

307 WATER SEAL SECONDARY GAS SEAL

307.1 The lower or buried portion of the riser will be assembled with a neoprene black rubber bushing. This bushing will have the epoxy coated steel casing compressed into the seal creating a watertight secondary gas seal at the bottom of each riser. This seal will also provide shear protection and bend deflection strength for the polyethylene pipe as it enters the riser casing.

308 BENDING

308.1 All risers 2” and smaller may be bent to vertical and horizontal dimensions. These risers will be bent on specially designed benders that protect the casing coating and do not kink the casing.

308.2 If coiled PE has been used in the assembly of a riser, that riser will be bent in the same direction as the existing PE pipe curve. This will prevent reverse yield forces on the PE pipe within the riser.

308.3 A riser shall be bent not less than the polyethylene pipe manufacturer's suggested minimum bend requirements within a steel casing. This suggested minimum bend is a radius no tighter than 12.5 times the PE pipe dia -where no joints are present.

309. LABELS

309.1 Each riser shall be labeled with a red stripe to indicate maximum ground level. No riser shall be buried in earth above this red line marker.

309.2 Each riser shall contain a product label denoting the steel thread size, the /plastic pipe size, the type of plastic used, and the lot number of that particular product run. This lot number is recorded with each invoice and "Certificate of Conformance" for quality control documentation and traceability,

Lot Number Example: 96134 = Year 1996, produced on the 134th day of 1996.

DIVISION IV - MSSCELLANEOUS

401. FABRICATION

401.1 The risers shall be fabricated in accordance with the above specification, RWLC specifications, and the pre-designed dimension drawing as agreed upon with the riser customer

401.2 The entire assembly shall be clean and internally free of paint, dirt, sand, and metal chips, or other debris.

401.3 GUARANTEE

LYCO® anodeless risers are to be used in natural/LP gas distribution systems, and are guaranteed to exceed the maximum hydrostatic pressure of the plastic pipe used within the riser. The riser will sustain a minimum test pressure of 100 psi for a 24-hour period and operate at 60 psi indefinitely. Risers will also sustain a tensile force greater than the ultimate strength of the plastic pipe for which the assembly was designed.

SPECIFICATIONS

- Meets or exceeds all requirements for the Categorization of Mechanical Fittings within ATM D2513-90c Category 1, and requirements from the Code of Federal Regulations, Title 49 part 192.281, 192.283 and 192.375.
- Meets or exceeds NFPA-58-1992.
- Listed with IAPMO/UPC and CSA.
- Pipe Threads conform to ANSI B1.20.1.
- All Gas Carrying Steel parts meet or exceed ASTM A53.
- Casing materials meet or exceed ASTM A53 or ASTM A513.
- All PE Pipe and Tubing components conform to ASTM D2513.
- All Flanges meet ASME/ANSI B16.5 or MSS D2513.
- Cathodic disbonding of electrostatic applied epoxy coating evaluated in accordance with ASTM G8-90.
- Effect of salt spray (fog) on electrostatic applied epoxy coating evaluated in accordance with B117-85.