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SPECIFICATION: **G-8107-16**

TITLE: **STEEL PIPE FOR GAS MAINS AND SERVICES**

VOLUME: **6**

REVISIONS: (See ★)

1) This specification has been revised to incorporate comments made by GTI's technical experts and Con Edison's subject matter experts.

2) Section 3.1 - Clarified that the latest editions of the applicable ASTM and API standards are to be use for conformance.

3) Section 4.1 (C) - Added API 5L X60 and X70 as approved grades.

4) Section 4.2 (C) - Added X60 and X70 as approved for the submerged arc weld manufacturing process.

5) Section 4.2 (D) - Added section indicating pipe grades approved for the double submerged arc weld manufacturing process.

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Gas Operations Standards

TITLE: STEEL PIPE FOR GAS MAINS AND SERVICES

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1.0 SCOPE

This specification concerns the purchase of steel pipe for use on the Company gas system.

2.0 DEFINITIONS

2.1	Company	-	Consolidated Edison Company of New York, Inc.
2.2	Manufacturer	-	The party that manufactures steel pipe.
2.3	Coater	-	The party that applies coating on bare steel pipe prior to delivery to the Company.
2.4	Vendor	-	The party from whom the Company purchases the pipe.
2.5	API	-	American Petroleum Institute.
2.6	ASTM	-	American Society for Testing and Materials.

3.0 GENERAL REQUIREMENTS

★ 3.1 All steel pipe shall conform to this specification and to

- ASTM Specification A53/A53M- "*Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*" in accordance with the latest edition of A53/A53M.

or

- ASTM Specification A106/A106M - "*Standard Specification for Seamless Carbon Steel Pipe for High - Temperature Service*" in accordance with the latest edition of A106/A106M

or

- In accordance with the latest edition of API Specification 5L/ISO 3183 "*Specification for Line Pipe*" which includes the latest Errata and Addendums.

The indicated revisions are incorporated by reference in 16 NYCRR Part 10. In cases where this specification differs from the ASTM or API Specifications, this specification shall prevail.

3.2 Aluminum pipe or pipe made from amphoteric materials is not approved.

4.0 MATERIALS AND MANUFACTURING PROCESS

4.1 The following grades of steel are approved for gas piping:

A) ASTM A53 Grade B

B) ASTM A106 Grade B

★ C) API 5L Grades B, X42, X46, X52, X56, X60 and X70.

4.2 The following processes of manufacture conforming to ASTM A53, ASTM A106, and API 5L are approved for gas piping:

A) Seamless - all sizes

B) Electric Resistance Weld - all sizes

★ C) Submerged Arc Weld - 20" O.D. and larger for Grade B and for API 5L X42, X46, X52, X56, X60 and X70.

★ D) Double Submerged Arc Weld - 20" O.D. and larger for Grade B and for API 5L X42, X46, X52, X56, X60 and X70.

4.3 The interior of all pipes shall be smooth, free of scale, oil, grease and projections.

5.0 APPROVED STEEL PIPE SIZES AND GRADES

The following pipe sizes and grades are approved for Distribution (up to 99 psig) and Transmission (above 125 psig) for standard construction.

Nominal Pipe Size In.	Outside Diam. In.	Identification-Steel: Iron Pipe Size	Sched. No.	Wall Thick. In.	CLASS & STOCK NUMBERS FOR WELDED END PIPES: Distribution (<=99 psig) (see Note a) Bare SGL R/L	Bare DBL R/L	Coated SGL R/L	Coated DBL R/L	Transmission (>125 psig) (see Note b)
1	1.315	Std.	40	0.133	320-1753	non-stock	323-0372	non-stock	
1	1.315	XS	80	0.179	320-0250	non-stock	non-stock	non-stock	
1 1/4	1.660	Std.	40	0.140	320-1761	non-stock	323-0729	non-stock	
1 1/4	1.660	XS	80	0.191	320-1415	non-stock	non-stock	non-stock	
1 1/2	1.900	Std.	40	0.145	320-1779	non-stock	323-0349	non-stock	
1 1/2	1.900	XS	80	0.200	320-1423	non-stock	non-stock	non-stock	
2	2.375	Std.	40	0.154	320-0367	non-stock	non-stock	non-stock	
2	2.375	XS	80	0.218	320-1431	non-stock	non-stock	323-0711	
3	3.500	Std.	40	0.216	320-0359	non-stock	323-0299	non-stock	
3	3.500	XS	80	0.300	320-1456	non-stock	non-stock	non-stock	
4	4.500	Std.	40	0.237	320-0342	non-stock	323-0273	323-0596	Contact Gas Transmission Engineering - Major Projects to specify appropriate schedule and grade of transmission pipe (>125 psig)
4	4.500	XS	80	0.337	320-1464	non-stock	non-stock	non-stock	
6	6.625	Std.	40	0.280	320-1613	320-0334	323-0612	323-0257	

5.0 APPROVED STEEL PIPE SIZES AND GRADES (Continued)

Nominal Pipe Size In.	Outside Diam. In.	Identification-Steel Iron Pipe Size	Sched. No.	Wall Thick. In.	CLASS & STOCK NUMBERS FOR WELDED END PIPES (Continued) Distribution (<=99 psig) (see Note a) Bare SGL R/L	Bare DBL R/L	Coated SGL R/L	Coated DBL R/L	Transmission (>125 psig) (see Note b)
6	6.625	XS	80	0.432	320-1472	non-stock	non-stock	non-stock	Contact Gas Transmission Engineering - Major Projects to specify appropriate schedule and grade of transmission pipe (>125 psig)
8	8.625	Std.	40	0.322	320-2009	non-stock	323-0620	323-0240	
8	8.625	XS	80	0.500	320-1522	non-stock	non-stock	non-stock	
10	10.750	Std.	40	0.365	320-0318	non-stock	323-0638	323-0224	
10	10.750	XS	60	0.500	320-1803	non-stock	non-stock	non-stock	
12	12.750	Std.	-	0.375	320-2025	320-0300	323-0646	323-0216	
12	12.750	XS	-	0.500	320-1530	non-stock	non-stock	non-stock	
16	16.000	Std.	30	0.375	320-0292	non-stock	non-stock	323-0208	
16	16.000	XS	40	0.500	320-1829	non-stock	non-stock	non-stock	
20	20.000	Std.	20	0.375	320-2264	320-0284	non-stock	323-0182	
20	20.000	XS	30	0.500	non-stock	non-stock	non-stock	non-stock	
24	24.000	Std.	20	0.375	320-0276	non-stock	non-stock	323-0166	
24	24.000	XS	-	0.500	320-2298	320-0243	non-stock	non-stock	
26	26.000	Std.	-	0.375	non-stock	non-stock	non-stock	non-stock	
26	26.000	XS	20	0.500	non-stock	non-stock	non-stock	non-stock	
30	30.000	Std.	-	0.375	non-stock	320-1969	non-stock	323-0737	
30	30.000	XS	20	0.500	non-stock	320-2462	non-stock	323-0810	
36	36.000	Std.	-	0.375	non-stock	320-0227	non-stock	non-stock	
36	36.000	Std.	-	0.562	non-stock	non-stock	non-stock	non-stock	
36	36.000	Std.	30	0.625	non-stock	non-stock	non-stock	non-stock	

Note a) - Any approved schedule and grade of steel may be used for distribution pipe (<=99 psig). See Section 4.1

Note b) - Contact Gas Transmission Engineering - Major Projects to specify appropriate schedule and grade of transmission pipe (>125 psig). See Section 13.6 for toughness testing requirements for transmission pipe (>125 psig).

6.0 APPROVED LENGTHS

6.1 Pipe lengths approved are:

A) Single Random lengths (SR) 20 feet, and Double Random lengths (DR) 40 feet with the following tolerances:

	SR	DR
Shortest length in the entire shipment	18.0 feet	35.0 feet

6.0 APPROVED LENGTHS

B) Longest lengths available.

C) Lengths as ordered on individual requisitions.

6.2 Jointers, two or more shorter lengths of pipe joined together by welding or other means to meet length requirements, are not acceptable.

7.0 PIPE ENDS

7.1 Pipe that is 2 inches in diameter and larger shall be beveled for welding to conform to the requirements of API 5L or ASTM A106.

7.2 End tolerances shall conform to API 5L or ASTM A106 to facilitate the installation of mechanical compression joints.

7.3 The inside and outside edges of the pipe ends shall be free of burrs, projections, dents or gouges.

8.0 PIPE COATING

8.1 Coating, when required shall be as per Purchase Specification G-8062, "Extruded Polyolefin Coating on Steel Gas Pipe".

8.2 Bare steel pipe supplied to the Company shall have a lacquer coating, uniform in thickness on the outside pipe surface. No coating is required on bare steel pipe supplied to a coater.

8.3 Galvanized steel pipe is not approved.

9.0 PIPE MARKINGS

9.1 By Manufacturer - Marking of all bare pipe shall conform to the requirements of API 5L, ASTM A106 or ASTM A53.

9.2 By Coater or Vendor - Coated pipe purchased shall have the pipe diameter, wall thickness, grade, Con Ed, date pipe was coated, heat number and API or ASTM specification under which the pipe has been manufactured paint stenciled on the coating surface as per API 5L, ASTM A106 or ASTM A53 along the pipe length.

9.0 **PIPE MARKINGS** (Continued)

9.3 All required markings shall be legible and permanent.

10.0 **TRANSPORTATION AND PROTECTION OF PIPE**

10.1 Pipe transportation, handling and storage shall be in accordance with Company Specification G-8003, "Transporting, Handling, and Storing Steel Gas Pipe".

10.2 The vendor shall be responsible for damages to the pipe or coating due to transportation.

11.0 **INSPECTION AND REJECTION OF PIPE**

11.1 Bare pipe shall be visually inspected for dents, gouges, grooves, or arc burns prior to surface preparation by the Coater. Any defects found shall be reported to the Transportation and Stores Department of the Company and the damaged pipe length in question shall not be coated.

11.2 A dent that contains or affects the longitudinal weld is not acceptable.

11.3 Pipe containing a dent in which the dent contains a scratch, gouge, groove or arc burn is not acceptable. A dent may be defined as a depression, which produces a gross disturbance in the curvature of the pipe wall as opposed to a scratch or gouge that reduces the pipe wall thickness.

11.4 The pipe shall contain no dents greater than 1/4 inch. The length of the dent in any direction shall not exceed one-half the pipe diameter.

11.5 Pipe containing gouges or grooves having a depth greater than 12 percent of the specified wall thickness, measured from the surface of the pipe is not acceptable.

11.6 Pipe containing any arc burns is not acceptable.

11.7 The Company reserves the right to inspect, test and subsequently reject any pipe that does not conform in any way to the standards set forth in this specification, or the API or ASTM Specification under which the pipe is manufactured, or the associated coating specifications as set forth herein. The vendor shall be liable for all costs incurred by the Company as a result of pipe failing to comply with this specification.

12.0 APPROVED MANUFACTURERS

12.1 The following pipe manufacturers are approved:

DOMESTIC		FOREIGN	
Mill Name	City,State	Mill Name	City, Country
American Steel Pipe	Birmingham, AL	Hyundai Pipe Co.	Ulsan, S. Korea
Berg Steel Pipe Corp.	Panama City, FL	Mannesmann	Hamm, Germany
Dura-Bond Pipe	Steelton, PA	Mittal/Iscor Steel Vereeniging,	S. Africa
Ipsco Tubulars	Camanche,IA	Seah Steel Corp.	Pohang City, S.Korea
Koppel Steel	Ambridge, PA	Sumitomo Metal	Japan
Lone Star Steel	Lone Star, TX	Tenaris Dalmine	Dalmine, Italy
Maverick Tube	Conroe, TX	Tenaris Siderca	Buenos Aires, Argentina
Newport Steel	Wilder, KY	Tubacero	Monterrey,Mexico
Paragon Industries	Sapulpa, OK	Zeleziarne-Podbr.	Podbrezova, Slovakia
Sharon Tube	Sharon, PA		
Stupp Corp.	Baton Rouge, LA		
Tex-Tube	Houston, TX		
USS- Div. of USX Corp.	Lorain, OH		
USS- Div. of USX Corp.	McKeesport, PA		
V&M Star	Houston, TX		
V&M Star	Youngstown, OH		
Wheatland Tube	Wheatland, PA		

Pipe manufactured by companies other than those listed above shall be purchased only with the written approval of the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative.

12.2 Manufacturers or vendors supplying pipe which do not conform to this specification and/or display poor workmanship shall not be acceptable for subsequent bids until written approval is received from the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative.

12.3 The Company's Purchasing Department may canvass other pipe manufacturers and direct all potential pipe suppliers to the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative who will evaluate the manufacturer's product in accordance with the contents of this specification.

12.4 Manufacturers not approved in Section 12.1 may request consideration for approval by submitting quality control procedures, specifications, catalogs, and a certificate that all pipe supplied will meet the requirements of this specification. This shall be sent to the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative.

13.0 QUALITY CONTROL

13.1 The vendor shall submit written notification to the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative of any changes to be made by the manufacturer concerning the design, fabrication, material or marking of the pipe. This notification shall be made in advance of any changes and must receive written approval from the Chief Gas Engineer, Gas Transmission Engineering or duly authorized representative in order to be acceptable.

13.2 The vendor shall keep records of **all** materials supplied to Con Edison. The records shall include mill certificates, the material description, the manufacturer and the heat numbers. They shall be available to Con Edison upon request.

13.3 The vendor shall maintain a quality control program to insure that all pipe shipped to Con Edison meets referenced standards.

13.4 For pipe that is 8" and larger, dimensional data shall be recorded for a minimum of 10% of each item in each shipment. Dimensional data shall include outside diameter, wall thickness, roundness, bevel ends, etc. The vendor shall externally mark each inspected length of pipe with a **painted yellow dot** readily visible to Con Edison inspectors. The vendor shall maintain these records at their facility and make them available to Con Edison upon request.

13.5 When an out-of-specification length of pipe is found by the vendor in a shipment, the entire shipment shall be inspected and documented before shipment to Con Edison. The vendor shall maintain these records at their facility and make them available to Con Edison upon request.

13.6 Any pipe to be used for transmission (>125psig) shall be toughness tested as per “Appendix A - Steel Pipe Toughness Standards For All New Pipe >125 Psig”. This will be requested when required. These test results will be sent to Gas Transmission Engineering – Major Projects for approval prior to delivery to the pipe coater and Con Edison. One set of toughness tests is required for every 100 lengths per heat of pipe.

APPENDIX A

STEEL PIPE TOUGHNESS STANDARDS FOR ALL NEW PIPE > 125 PSIG

PIPE SAMPLES:
1" through 10", cut 6" long pipe section
12" through 36", cut 8" x 8" coupons
Note: the test coupon must include the seam area on all welded pipe.

PIPE IDENTIFICATION:
Samples shall be from the same lot number or heat number.

CHARPY V-NOTCH (CVN) TOUGHNESS TESTS:
Full size samples shall be tested at a temperature of –10 degrees F and as per API 5L SR5A/SR5B, ASTM E23 and ASTM A370. Three CVN specimens shall be evaluated for each test: the Base Metal, the Weld, and the Heat Affected Zone (HAZ). Acceptable values for each test are as follows:

ABSORBED ENERGY: MINIMUM OF EACH TEST SPECIMEN ≥ 15 FT-LB

LATERAL EXPANSION: MINIMUM OF EACH TEST SPECIMEN ≥ 0.020 IN.

PERCENT SHEAR: MINIMUM OF EACH TEST SPECIMEN ≥ 20 %

Note: If subsize samples are used, the test temperature shall be lowered and absorbed energy adjusted to be equivalent to full size samples at –10 degrees F as per ASTM A370 and ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1, Subsection A, UG-84 requirements. Also for this condition (sub size samples) percent shear is not required.