28039-576P

CATALYTIC, INC.
Engineering Department

PLANT: Ginna Nuclear Power Plant

CATALYTIC CONTRACT NO. 36720

CLIENT: Rochester Gas & Electric Corp;

SPECIFICATION NO. 36720-1300-76

LOCATION: Ontario, New York

SPECIFICATION

for

PIPING FIELD FABRICATION AND ERECTION

CONSISTING OF

	CONSTRUCTION	
	LIMITED CONSTRUCTION: AS NOTED	
Reference Attachments:	PRELIMINARY NOT FOR CONSTRUCTION	
	BIDDING PURPOSES	
DATE	RELEASED FOR	ENGR.

2ND LEVEL REVIEW COMPLETED FORM

REV.	ENGR.	DATE
C	JWS	4/27/80
O	[illegible]	[illegible]
06	JWS	3/18/80
1	NR.	TLS
1a	JWB	4/4/80
2	NR.	RLP

Item Number

Description

Safety Related ☒

Non-Nuclear Safety ☐

Approved T. L. Snyder / RLP
PROJECT MANAGER

Date 2-27-80

Approved R. L. Patel
PROJECT ENGINEER

Date 2-27-80

Approved M. Stevens
QUALITY ASSURANCE ENGINEER

Date 2-27-80

Prepared By W. C. Chayka
LEAD ENGINEER

Date 20 DEC. 79

Amendment	Approved	Date	Approved	Date	Approved	Date	Approved	Date
	Engineer		Q.A. Engineer		Project Engineer		Project Manager	
2	CDDresser	3/26/80	MStevens	4-4-80	RLP	4-4-80	TLS	4/9/80
1	CDDresser	3/18/80	MStevens	3-18-80	RLP/JJC	3/18/80	TLS	3/18/80
0	WCChayka	2/27/80	MStevens	2-27-80	RLPatel	2-27-80	TLS/RLP	2-27-80
C	WCChayka	2/22/80						
B	WCChayka	1/22/79						
A	WCChayka	12/20/79						

PIPING FIELD FABRICATION AND ERECTION SPECIFICATION NO. 36720-1300-76

TABLE OF CONTENTS

1.0 SCOPE

1.1 This specification establishes the requirements for fabrication, erection, examination, testing, system cleaning and flushing of ASME, Section III, Class 1, 2 and 3 Nuclear and ANSI B31.1 Non-Nuclear piping for mechanical modifications at Rochester Gas & Electric's Ginna Station.

1.2 The classification of piping is indicated by the line specification number shown on the drawings.

2.0 APPLICABLE DOCUMENTS

2.1 The following documents shall be considered as part of this specification to the extent specified.

a. ASME Boiler and Pressure Vessel Code, Section III, Nuclear Power Plant Components, 1977 Edition with addenda through Summer 1979, (hereafter called "Section III").

b. ASME Boiler and Pressure Vessel Code, Section V, Nondestructive Examination, 1977 Edition with addenda through Summer 1979, (hereafter called "Section V").

c. ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications, 1977 Edition with addenda through Summer 1979, (hereafter called "Section IX").

d. ASME Boiler and Pressure Vessel Vode, Section XI, Inservice Inspection, 1977 Edition with addenda through Summer 1979, (hereafter called "Section XI").

e. ANSI Code for Pressure Piping - Section B31.1 "Power Piping", 1977 Edition with addenda through Summer 1979, (hereafter called"B31.1").

f. ANSI N45.2.1 - "Cleaning of Fluid Systems and Associated Components during Construction Phase of Nuclear Power Plants," 1973 Edition.

g. ANSI N45.2.2 - "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants", 1972 Edition.

h. Pipe Fabrication Institute Standards (PFI) ES-3 (April 1974) and ES-24 (April 1975).

i. ANSI B16.11 - Forged Steel Fittings, Socket Welded and Threaded, 1973 Edition.

2.1 (Continued)

j. ANSI B2.1 - Pipe Threads, 1968 Edition.

k. ANSI B16.25 - Butt welding ends, 1972 Edition.

l. ASME Boiler and Pressure Vessel Code, Section II, 1977 Edition with addenda through Summer 1979, (hereafter called "Section II").

m. ASTM Material Specifications, Edition as specified in ANSI B31.1.

n. American Welding Society, AWS A4.2, 1974 Edition.

3.0 GENERAL

3.1 Class 1, 2 and 3 Nuclear Piping materials, fabrication, welding, erection, examination and testing shall be in accordance with the rules of Subsection NB, NC and ND of Section III, respectively.

3.2 Non-nuclear piping materials, fabrication, welding, erection, examination and testing shall be in accordance with the rules of B31.1.

3.3 All work within the scope of this specification shall be performed in accordance with the requirements of this specification and all applicable drawings, referenced codes or specifications, and purchase orders. No deviations shall be made from these documents without prior written approval.

3.4 Approvals, interpretation, and clarifications shall be obtained using established administrative procedures.

4.0 MATERIALS

4.1 All materials used for piping within the scope of this specification shall conform to the applicable ASTM or Section II material specification listed in the Piping Material Specification referenced on the drawings.

4.2 Materials other than those listed in the Piping Materials Specification unless specified on the drawings shall not be used without prior approval from the Owner.

4.3 Austenitic stainless steel materials shall not be contaminated during any stage of installation, examination, testing, cleaning and storage with low melting point alloys. Stainless steel shall not come in contact with halogen containing compounds such as fluorides or chlorides.

4.4 A written procedure shall be established to describe the method used to control receipt, testing, storage, baking, drying, and disbursal of all welding materials. Storage of weld materials shall meet the requirements of ANSI N45.2.2 for Level B components.

4.5 All piping materials (pipe, fittings, valves, bolting, gaskets, etc.) shall be stored in accordance with the requirements of ANSI N45.2.2 for the applicable level of component.

4.6 Material identification shall be transferred to all pieces when a part is cut or divided into more than one piece to assure identification of each piece of material during subsequent fabrication or installation. Materials shall be marked by a method which will not result in any harmful contamination or sharp discontinuities. Stamping, when used, shall be done with blunt nosed continuous or blunt nosed interrupted dot die stamps.

5.0 DESIGN

5.1 The design and layout of all piping shall be as shown on the drawings.

6.0 FIELD FABRICATION

6.1.1 Piping fabrication tolerances, for offsite prefabricated subassemblies, shall be in accordance with PFI standard ES-3.

6.1.2 Allowable deviations from the specified dimensions and configurations shall be in accordance with the notes contained on the drawings.

6.2 Layout, Cutting and Fit-Up Requirements

6.2.1 Prior to prefabrication of pipe spools, the installer shall verify the accuracy of critical dimensions by means of a field check.

6.2.2 A template shall be used in laying out headers, miters, laterals, and other irregular details to insure accurate cutting and proper fit-up. All cutting shall conform to the outline of the template.

6.2.3 The use of tack welds, bars, clamps, etc., to facilitate the fitting and aligning of parts shall be in accordance with Section III, Subsections NB, NC and ND-4230 and B31.1, Para. 127.4.2B, as applicable.

6.2.4 Mismatch of aligned piping shall be within the limits defined by Section III, Fig. NB, NC or ND-4233-1 for Class 1, 2 and 3 and B31.1 Fig. 127.3.1 for non-nuclear piping.

6.2.5 Flange bolt holes shall straddle the established pipe centerlines unless other orientation is required to match flange connections on equipment.

6.2.6 Machined bevels to form the weld groove are preferred, but smooth, clean slag free thermal cut bevels are acceptable providing the preheat requirements of Appendix D of Section III are met where applicable.

6.2.7 Threading of pipe shall preferably be done after bending, forging, heat treating or welding operations. Where subsequent threading is impracticable and threads are cut first, they shall be fully protected during such operation with screwed metal plugs or pipe caps. Threads shall be concentric with the outside of the pipe and shall conform to ANSI B2.1.

6.2.8 All pipe ends that are to be butt-welded shall be beveled in accordance with Rochester Gas & Electric Corp., drawing 10904-44, unless indicated otherwise on the design drawing.

6.2.9 All pipe ends that are to be socket welded shall be square cut in accordance with ANSI B16.11. A 3/32" pull-back is required on all socket welds prior to welding. This 3/32" pull-back shall be verified as follows:

a. The pipe shall be inserted into the fitting and pushed against the shoulder.

b. Lines shall be scribed on the pipe and the fittings having a separation of 1".

c. The pipe shall then be pulled back a minimum of 3/32" and a maximum of 1/8" and the joint tacked.

d. Prior to filling in the weld, it shall be verified with a template or machinists scale that the scribed lines are a minimum of 1-3/32" and a maximum of 1-1/8" apart.

6.3 Pipe Bending

6.3.1 Pipe bending shall be in accordance with Section III, B31.1 and PFI Standard ES-24 as applicable.

6.3.2 Radii of bends shall be in accordance with the design drawings. Circumferential welds shall not be permitted in the radius or pulling tangent.

6.3.3 Field bending of stainless steel pipe shall not be permitted.

6.3.4 Field bending of stainless steel or copper instrument tubing is permitted. Special bending tools, mandrels or dies shall be used to control the bend radius and to prevent buckling or excessive flattening.

6.3.5 Carbon steel pipe may be bent hot or cold.

6.3.6 When pipe is bent cold, it shall be performed in pipe bending machines to insure the absence of wrinkles and a minimum of flattening.

6.3.7 Stress relieving, when required, of carbon steel pipe that has been bent cold shall be performed at the required temperature and holding times stated in Section III or B31.1, as applicable. After stress relieving, the pipe shall be allowed to air cool in still air.

6.3.8 When carbon steel pipe is bent hot, it shall be first filled compactly with a sulphur-free high temperature silica sand of suitable grade and fineness. The pipe shall be vibrated by suitable mechanical or manual means while being filled. The ends of the pipe shall be suitably plugged or capped to confine the sand.

6.3.9 When sand is used in hot bending of carbon steel pipe, it shall be completely removed from the section prior to installation, by blowing out with air as a minimum procedure.

6.3.10 Sand filling of the pipe prior to bending may be omitted if it has been determined that the pipe wall is thick enough to keep flattening within the accepted limits.

6.3.11 Low carbon steel pipe (less than .25% carbon) that is to be hot bent shall be uniformly preheated to between 1800°F. and 2000°F. At no time during bending shall the pipe temperature drop below 1650°F. No postbend heat treatment shall be required if the bend is allowed to air cool in still air after bending and prior to removing the sand.

6.4 Welding

6.4.1 All weld procedures, welders and welding operators for Nuclear piping shall be qualified in accordance with Section IX as supplemented by the requirements of Section III , NB-4300, NC-4300 and ND-4300 for Class 1, 2 and 3 respectively.

6.4.2 All weld procedures with qualification test records for Nuclear and Non-Nuclear Piping shall be submitted for approval prior to the start of any work.

6.4.3 Each pipe weld shall be marked with the welders or welding operators symbol and an identification number. Markings shall not interfere with interpretation of examinations and inspections of welds. Steel indentation stamping shall be the low stress type if utilized.

6.4.4 The root pass of all butt welds and branch welds shall be done with the Gas Tungsten Arc (TIG) process using inert gas backup. The inert gas backup shall be maintained through the second layer of weld or until the weld thickness reaches 1/8", whichever is greater. Welds shall be filled out using the Gas Metal Arc (MIG) process with spray arc mode of transfer, the Gas Tungsten Arc (TIG) process, the Shielded Metal Arc process or the Submerged Arc process.

6.4.5 All tack welds shall be done by the same process as the root pass, or shall be completely removed prior to making the root pass.

6.4.6 All welding shall penetrate to the full depth of the pipe. The slag shall be cleaned from each weld layer and any defects be removed before the next layer is applied. The completed weld shall be cleaned of slag and spatter metal on all surfaces.

6.4.7 Welding preheat and post weld heat treatment requirements for Nuclear piping shall be in accordance with the requirements of Section III, and the qualified weld procedure.

6.4.8 Welding preheat and post weld heat treatment for Non-Nuclear piping shall be in accordance with the requirements of ANSI B31.1 and the qualified weld procedure.

6.4.9 No circumferential welds on the process pipe shall be located within wall or floor sleeves. Maintain clearance of 12 inches from edge of sleeves, unless configuration prohibits.

6.4.10 All circumferential process pipe welds shall be located so as to be accessible for inspection. Welds shall not be obstructed by supports or structures.

7.0 ERECTION

7.1 General

7.1.1 All piping shall be worked into place without springing or forcing.

7.1.2 All piping shall be adequately supported during construction so that excessive moments or loads are not placed on equipment or other piping.

7.1.3 Temporary construction supports shall not be welded to the pipe and shall be attached in a manner that will not damage the pipe. These supports shall be completely removed upon completion of construction.

7.1.4 All valves received without individual tag number shall be tagged after installation in accordance with the piping and instrumentation drawings.

7.1.5 All valves shall be installed so as to minimize piping strains and bending moments on the valves. Valves in horizontal runs of pipe shall be installed with the stems vertical unless otherwise specified on the drawings.

7.1.6 All valves shall be installed in the proper direction regarding flow, as indicated on the valve body.

7.1.7 When post weld heat treating or welding valves into a piping run, valve closure parts shall be off the valve seat.

7.1.8 All piping joints shall be welded unless otherwise specified on the drawings or specifications.

7.1.9 The installer shall familiarize himself with equipment, drawings, and manufacturer's recommended installation.

7.1.10 Relief and safety valve settings shall not be modified in any way by the installer.

7.1.11 Pipe supports and attachments to pressure retaining materials shall meet the applicable requirements of Subsection NF of Section III for Class 1, 2 and 3 and B31.1 for Non-nuclear.

7.2 Threaded Joints

7.2.1 Threaded piping joints shall only be used where so specified by the design drawings or Material Specifications.

7.2.2 Threaded joints in carbon steel pipe shall be coated with an approved joint compound on the male end of the pipe joint, except as noted.

7.2.3 Threaded joints which will be seal welded shall be assembled without sealant or lubricant.

7.2.4 Stainless steel threaded joints not seal welded shall be assembled using Never-Seize lubricant or approved equal. The lubricant and sealant shall not be detrimental to stainless steel material.

7.2.5 Tube fittings shall use Crawford Fittings Co. sealant "Blue Goop" or approved equal for lubricating and sealing of threads.

7.2.6 Care shall be taken to avoid overtightening of threaded joints and care shall be taken to avoid damaging the pipe exterior with the pipe wrench.

7.2.7 Backing off of made-up threaded joints to facilitate fit-up or alignment will not be permitted.

7.3 Flanged Joints

7.3.1 All gaskets and bolting materials for flanged joints shall be new, undamaged and shall comply with the Piping Materials specification referenced on the drawings.

7.3.2 Care shall be taken to assure that all gaskets are properly positioned prior to tightening of the bolts.

7.3.3 All threads and nut bearing surfaces shall be thoroughly lubricated prior to assembly with the following materials:

a) Carbon and low-alloy steel materials outside of primary containment shall be lubricated with Crane "Anti-Seize Compound for High Temperature" or approved equal.

b) Stainless steel materials outside primary containment shall be lubricated with Crawford Fitting Co. "Blue Goop" or approved equal.

c) All materials inside primary containment shall be lubricated with a mixture of graphite and denatured alcohol.

7.3.4 Care shall be taken to avoid overtorquing bolts.

7.4 Welded Joints

7.4.1 All welding shall be in accordance with Section 6.4 of this specification.

7.4.2 Socket weld fittings shall be fit-up using the "pull back" procedure specified in paragraph 6.2.9 of this specification.

7.5 Brazing and Soldering

7.5.1 The requirements for brazing and soldering shall be in accordance with Section IX and B31.1 as applicable.

7.5.2 If welding and brazing (or soldering) are to be done on the same assembly, the welding shall precede the brazing (or soldering) unless it is determined that the heat of welding will not adversely affect the braze previously made.

7.5.3 Brazed joints that depend upon a fillet rather than capillary type filler additions are not acceptable.

7.5.4 Brazing procedure and brazers shall be qualified per ASME Section IX. All brazing procedures with qualification test records shall be submitted for approval prior to the start of any work.

7.5.5 Peening shall not be performed.

7.6 Supports

7.6.1 Supports for all piping shall be located, fabricated and installed in accordance with the design drawings and the specifications referenced thereon.

7.6.2 Allowable materials for supports shall be as stated on the design drawings.

7.6.3 Supports and anchors shall not be welded directly to the pipe unless specifically required by the design drawings.

7.6.4 In no case, shall any supports be welded to the steel liner inside the containment building.

7.7 Instrument Tubing

7.7.1 Instrument tubing shall be field run in accordance with the approximate routings shown on the drawings. The use of elbow fittings shall be minimized; tubing bends shall be used wherever possible.

7.7.2 The installation of tubing fittings shall be done in accordance with the fitting manufacturer's recommended installation procedures.

8.0 EXAMINATION

8.1 The non-destructive examination of welds listed in this section are minimum requirements and shall not modify or delete any additional requirement found elsewhere in this Specification, in Section III or in B31.1.

8.2 The non-destructive examination requirements of all field welds shall be in accordance with this section including the requirements contained in paragraph 8.10 (Section III, Class 1), 8.11 (Section III, Class 2 and 3) and 8.12 (for B31.1) of this specification.

8.3 The procedures and acceptance standards for examination of all piping welds shall be in accordance with ASME Sections III and V.

8.4 All welds shall be visually examined by the installer in addition to all other examinations required by this specification or the applicable codes. Visual examination of the surface shall verify acceptability of the surface of the welds by assuring that it is free from undercutting in excess of 1/32" or the code limit, whichever is less and by assuring that there is no visible slag inclusions, cracks or lack of fusion.

8.5 Non-destructive examination of each weld shall be done as soon as possible after the weld is completed so that the weld can be painted before a rust film appears; however, painting shall not be performed until after system testing is completed. All welds shall be free of rust prior to non-destructive examination.

8.6 The surface finish of all welds shall be such that proper interpretation of the test results is possible.

8.7 The surface finish of all Nuclear Class 1 and 2 welds shall be in accordance with paragraph 8.9 to allow proper interpretation of future inservice NDE examinations required by Section XI. The contact surface for ultrasonic examination (the weld and the base metal) shall be free of weld spatter, and other roughness such as weave, lack of bond, undercutting, surface pin holes, or other surface discontinuities which will interfere with the performance of ultrasonic examination. The weld shall merge smoothly into the surfaces of the adjacent base material. In addition to the requirements of paragraphs 8.10 and 8.11, all nuclear Class 1 and 2 field welds in systems where inservice inspection is required shall be examined utilizing the same examination method that will be used for inservice examination. (The Owner will determine which systems require inservice inspection and what examination method is required).

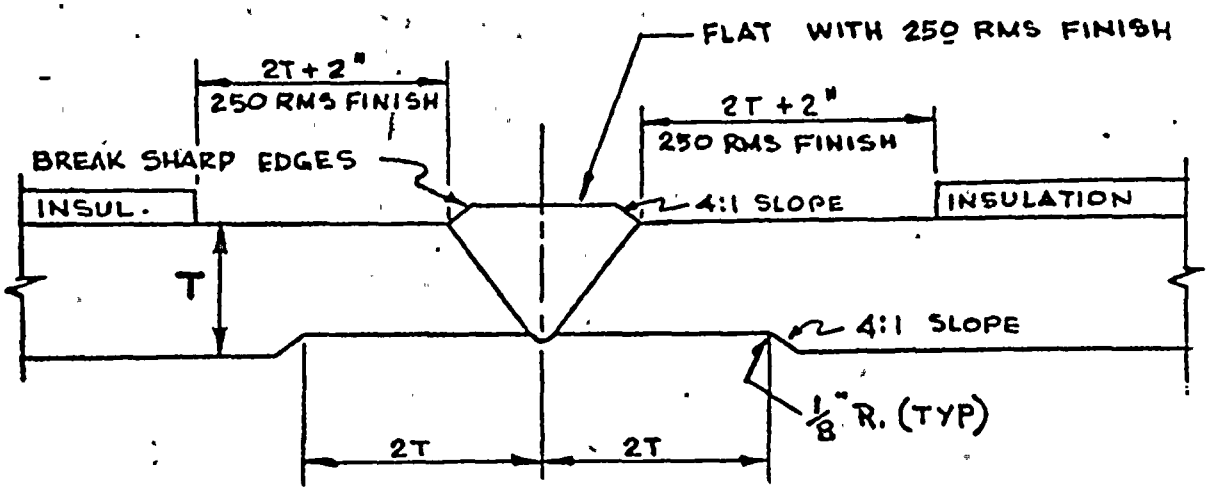
8.8 Repairs shall be examined by the same method as the original weld.

8.9 See Figure 1, page 11.

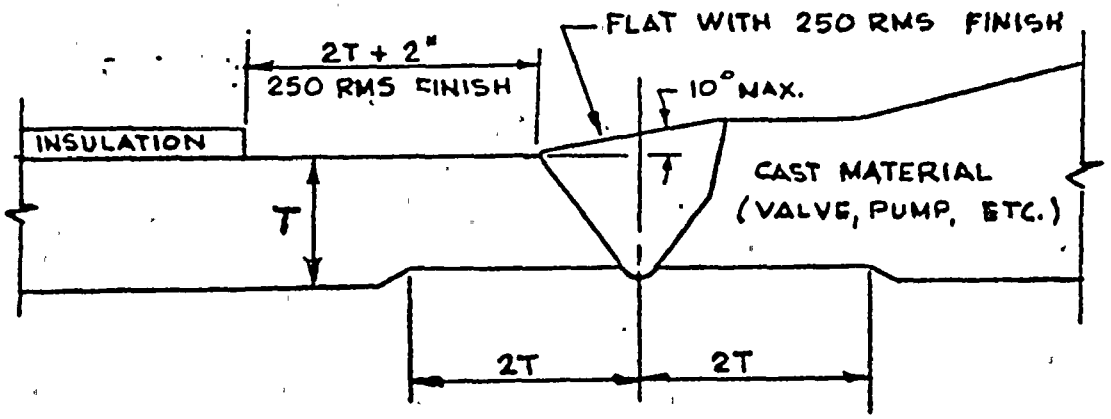
8.10 Non-Destructive Examination of Welds (Section III, Class 1 Piping)

8.10.1	Longitudinal Butt Welds	100% Radiographic examination of all welds with either magnetic particle or liquid penetrant examination on the external and accessible internal weld surfaces and adjacent base material for at least 1/2" on each side of the weld (NB-5210).
8.10.2	Girth Butt Welds	100% radiographic examination of all welds with either magnetic particle or liquid penetrant examination on the external and accessible internal weld surfaces and adjacent base material for at least 1/2" on each side of the weld (NB-5222).

Figure 1- Preparation of Finished Welds

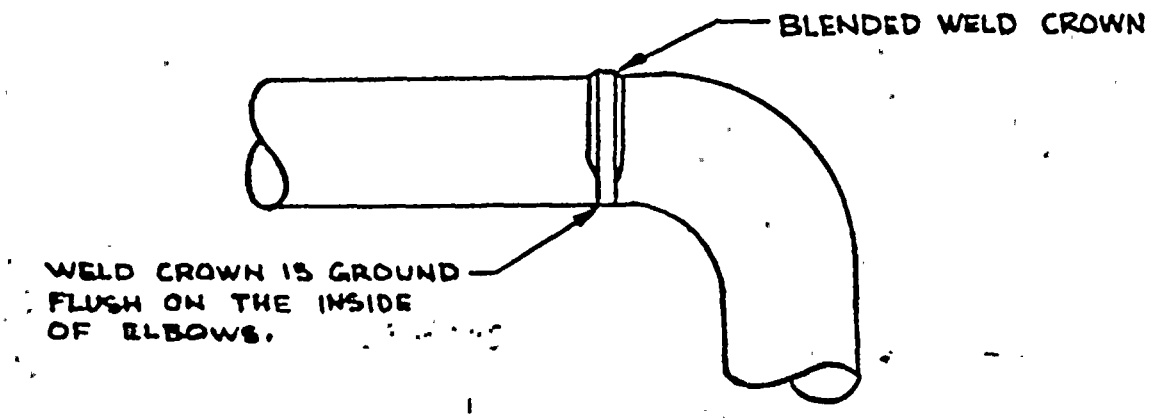


PIPE TO PIPE



PIPE TO CAST MATERIAL

1a



SHORT RADIUS ELBOWS

8.10 (Continued)

8.10.3	Full Penetration Butt Welded Branch Connections	100% radiographic examination of all welds with either magnetic particle or liquid penetrant examination on the external and accessible internal weld surfaces and adjacent base material for at least 1/2" on each side of the weld (NB-5242).
8.10.4	Full Penetration Corner-Welded Branch Connections	Greater than 4" nominal pipe size; 100% radiographic examination of all welds with either magnetic particle or liquid penetrant examination on the external and accessible internal weld surfaces and adjacent base material for at least 1/2" on each side of the weld (NB-5243). 4" nominal pipe size and smaller; magnetic particle or liquid penetrant on the external and accessible internal weld surfaces and adjacent base material for at least 1/2" on each side of the weld (NB-5243).
8.10.5	Fillet and Socket Welds	100% magnetic particle or 100% liquid penetrant examination (NB-5250).
8.10.6	Attachment Welds	100% magnetic particle or 100% liquid penetrant examination (NB-5250) (Note 8.10.8.3).
8.10.7	Seal Welds	100% magnetic particle or 100% liquid penetrant examination (NB-5271).

8.10.8 NOTES:

8.10.8.1 The code paragraphs referenced in 8.10.1 through 8.10.7 shall be the sources for detailed and specific requirements for each category.

8.10.8.2 All weld surfaces shall be subject to visual examination. (See para 8.4).

8.10.8.3 This includes the ground surfaces where fit-up and tack welds have been removed.

8.10.8.4 Brazed joints shall be visually examined.

8.11 Non-Destructive Examination of Welds (Section III, Class 2 and 3 Piping)

8.11.1	Longitudinal Butt Welds	All welds for Class 2 piping shall be examined 100% by radiography per NC-5212 plus magnetic particle or liquid penetrant examination. All welds for Class 3 piping shall be examined by radiography (note 8.11.7.6) plus 100% magnetic particle or liquid penetrant examination plus examination in accordance with ND-5212.
8.11.2	Girth Butt Welds	100% radiographic examination of all welds in accordance with NC-5222 and ND-5222, as applicable, plus magnetic particle or liquid penetrant examination.
8.11.3	Welded Branch Connections	Greater than 4" nominal pipe size; 100% radiographic examination of all welds in accordance with NC-5242 and ND-5242, as applicable plus magnetic particle or liquid penetrant examination. 4" nominal pipe size and smaller; magnetic particle or liquid penetrant examination per NC-5242 and ND-5242 as applicable.
8.11.4	Fillet and Socket Welds	100% magnetic particle or 100% liquid penetrant examination of all welds.
8.11.5	Attachment Weld	100% magnetic particle or 100% liquid penetrant examination (Note 8.11.7.3).
8.11.6	Seal Welds	100% magnetic particle or 100% liquid penetrant examination.

8.11.7 NOTES:

8.11.7.1 The code paragraphs referenced in 8.11.1 through 8.11.3 shall be the sources for detailed and specific requirements for each category.

8.11.7.2 All weld surfaces shall be subject to visual examination. (See Para. 8.4).

8.11.7.3 This includes the ground surfaces where fit-up and tack welds have been removed.

8.11.7.4 Brazed joints shall be visually examined.

8.11.7.5 Magnetic particle and liquid penetrant examination required in paragraphs 8.11.1, 8.11.2, and 8.11.3 shall include all external and accessible internal weld surfaces.

8.11.7.6 Radiography of Class 3 longitudinal butt welds is not required where system is designed for less than 300 psig.

8.12 Non-Destructive Examination of Welds (ANSI B31.1)

8.12.1	Longitudinal and Girth Butt Welds with Design Pressures Greater than 150 psig.	100% radiographic examination of all welds, plus 100% magnetic particle or 100% liquid penetrant examination.
8.12.2	Longitudinal and Girth Butt Welds with Design Pressures 150 PSIG or less.	100% magnetic particle or 100% liquid penetrant examination.
8.12.3	Welded Branch Connections Greater than 4" nominal pipe size with design pressure greater than 150 PSIG.	100% radiographic examination of all welds plus 100% magnetic particle or 100% liquid penetrant examination.
8.12.4	Welded Branch Connections 4" nominal pipe size or less or with design pressures 150 PSIG or less.	100% magnetic particle or 100% liquid penetrant examination.
8.12.5	Fillet and Socket Welds	100% magnetic particle or 100% liquid penetrant examination.
8.12.6	Attachment Welds	100% magnetic particle or 100% liquid penetrant examination (Note 8.12.8.2).
8.12.7	Seal Welds	100% magnetic particle or 100% liquid penetrant examination.

8.12.8 Notes:

8.12.8.1 All weld surfaces shall be subject to visual examination (See para. 8.4).

8.12.8.2 This includes the ground surfaces where fit-up and tack welds have been made.

8.12.8.3 Brazed joints shall be visually examined.

8.13 Ferrite Measurement

8.13.1 The ferrite content of groove welds (butt or tee) in stainless steel piping shall be measured as follows:

8.13.1.1 The measurement shall be taken using a magnetic gauge, such as Severn, Ferritescope, or Magnegage, calibrated in accordance with AWS A4.2-74.

8.13.1.2 Measurements shall be taken along the centerline of the surface of production welds at four points, approximately 90° apart, along the circumference of the weld. Measurements shall be on a sampling basis which shall include one weld in the first five welds made from each heat or lot of welding wire or covered electrodes and one weld in every ten production welds shall be checked thereafter.

8.13.2 Acceptance Standards

8.13.2.1 Measurement shall indicate an average from the four readings of at least 3% ferrite.

8.13.2.2 Any weld not meeting this requirement shall be reported as a nonconformance. Additional testing may be required if sample welds are not satisfactory.

9.0 TESTING

9.1 All testing on modifications and systems shall be in accordance with requirements indicated on the design drawings.

10.0 CLEANING

10.1 Cleaning and Cleanliness Control shall be in accordance with ANSI N45.2.1. The cleanliness classification for piping systems shall be as defined on the drawings.

10.2 The Installer shall have a cleaning procedure for the cleaning of materials and Field Fabricated subassemblies.

10.3 Field Fabricated subassemblies shall be cleaned after completion of subassembly work and prior to installation to remove mill scale, rust, foreign matter and other contaminants as required by this specification and the referenced standards. Just prior to final installation all piping shall be inspected and verified to be clean as required by this specification and the referenced standards. Particularly close inspection shall be made to those items whose end protectors or seals have been damaged or removed.

10.4 The interior of Field Fabricated piping after subassembly shall be of such quality that a high velocity water flush will bring it up to the level of cleanliness required for system operation.

10.5 Unless otherwise specified, water used in cleaning and flushing of piping shall meet the requirements for "freshwater" specified by ANSI N45.2.1.

10.6 The Installer shall have and implement a procedure to maintain the preinstallation level of cleanliness of all materials and sub-assemblies during installation.

10.7 Care shall be taken during construction not to introduce foreign materials into any pressure retaining items. Whenever an opening is not being worked on or is left unattended, such as between shift, a plug, cap or protector shall be placed on it and securely taped in place with tape meeting the following requirements.

10.7.1 Tape used with austenitic stainless steel materials shall not be compounded from or treated with chemical compounds containing elements in such quantities that harmful concentrations could be leached or released by the breakdown of the compound under expected environmental conditions (e.g. by radiation). Examples of such compounds are those containing fluorides, chlorides, sulfur, lead, zinc, copper and mercury.

10.7.2 All tapes shall be colored to contrast with materials with which they are used.

10.8 Operations which generate particulate matter, such as grinding and welding shall be controlled as not to allow indiscriminate deposits on cleaned areas.

10.9 All fitted and tack welded joints whose welds have not been completed shall be wrapped with polyethylene or other non-halogenated plastic film until the welds can be completed.

10.10 Cleanliness of materials shall be maintained by receiving, storing, and handling each item in accordance with ANSI N45.2.2 for the applicable classification of the item as specified in paragraph 2.7 of ANSI N45.2.2.

11.0 PAINTING

11.1 Near-white metal blast clean carbon steel components and then paint with one coat Carbozinc 11 or equal at a rate of 2.5 to 4.0 mils dry film thickness. In locations where blasting is not feasible as determined by the Owner, power tool cleaning may be substituted. CAUTION: Care shall be exercised to avoid contaminating stainless steel piping with this paint which contains zinc.

11.2 Painting shall be performed in accordance with the manufacturer's recommendations for surface preparation, thinning, solvents, application and drying.

12.0 QUALITY ASSURANCE

12.1 The Quality Assurance requirements of the Rochester Gas & Electric Corporation shall apply to all Seismic Category I piping systems fabricated and erected in accordance with this specification. The extent of Seismic Category I piping is shown on the drawings.

13.0 DOCUMENTATION

13.1 The installer shall maintain records on all materials, fabrication, welding, welding repairs and non-destructive examination. All such records, certificates, test data and welding and repair reports shall be available for review at the jobsite and submitted to the Owner upon completion. This documentation shall include:

a) Non-destructive examination records.

b) Radiographic films and reader sheets.

c) Certified Materials Test Reports (including impact test results) as required by the code or Certificates of Compliance where applicable.

d) Weld material disbursal, weld joint and weld repair records.

e) Deviation requests, non-conformance reports and resolutions.

f) Cleaning Records.

13.2 In addition to the above the installer shall maintain at the job site available for review, the following records:

a) Welder and Weld procedure qualification records.

b) Non-destructive examination procedure and personnel qualification records.