

REEDY CREEK IMPROVEMENT DISTRICT

HIGH PRESSURE (HPG) AND MEDIUM PRESSURE (MPG) NATURAL
GAS PIPING NEW CONSTRUCTION STANDARDS

PREPARED BY REEDY CREEK ENERGY SERVICES, INC.

REVISED JUNE 2016



REEDY CREEK IMPROVEMENT DISTRICT

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100 TITLE, PURPOSE, VALIDITY AND JURISDICTION

101 TITLE

- A. The provisions of this document shall constitute the “Reedy Creek Improvement District High Pressure (HPG) and Medium Pressure (MPG) Natural Gas Piping New Construction Standards.” This document replaces all formerly issued “Reedy Creek Improvement District HPG/MPG Gas New Construction Standards.” This document in its entirety is known as the “Standard” or “Standards” and is so referenced throughout the document.
- B. All natural gas distribution systems within the jurisdiction of this document are the property of the Reedy Creek Improvement District (RCID). These natural gas systems are operated by Reedy Creek Energy Services, Inc. as Reedy Creek Improvement District’s sole agent.

102 PURPOSE AND VALIDITY

- A. The purpose of the Standard is to define minimum acceptable criteria for materials and methods for both new construction and for the repair of medium and high pressure natural gas distribution mains and services in order to provide for the public health and safety as well as the protection of both public and private property.
- B. The Standard is based upon the Minimum Federal Safety Standard (MFSS), Parts 191, 192, and 199 Pipeline Safety Regulations Drug and Alcohol Testing as promulgated by the United States Department of Transportation and Chapter 25-12 FAC (Florida Administration Code). If any portion of this Standard is found to be in conflict with the MFSS and/or Chapter 25-12 FAC, the MFSS shall take precedence. Said finding shall not invalidate any other portion of the Standard found to be in compliance with the MFSS or Chapter 25-12 FAC.
- C. Where the Standard is more restrictive or conservative than the MFSS or Chapter 25-12, the Standard shall apply.
- D. Where a project’s plans and specifications are more restrictive or conservative than the Standard, the plans and specifications shall take precedence, otherwise the Standard shall govern.
- E. RCES shall be the sole arbiter of all conflicts and interpretations.

103 SCOPE

- A. The scope of the Standard includes pipeline components, fittings, design, cathodic protection, coating, jurisdiction, inspection, testing, certification of qualifications, documentation, metering and regulation, welding and joining, temporary controls and safety.
- B. The Standard shall govern new construction and repair of High Pressure Gas (HPG) distribution systems and Medium Pressure Gas (MPG) distribution systems.
- C. Medium Pressure Gas (MPG) is defined to be common pipeline natural gas at pressures of 5 psig or greater but not exceeding 60 psig. Exceptions to this definition may be made for a specific purpose when approved by the RCES Gas Engineer and the RCID Building and Safety Department.
- D. High Pressure Gas (HPG) is defined to be common pipeline natural gas at pressures greater than 60 psig.
- E. The jurisdictional boundary between the “Reedy Creek Improvement District High Pressure (HPG) and Medium Pressure (MPG) Natural Gas Piping New Construction Standards” and the Reedy Creek Improvement District’s EPCOT Gas Code is defined as the first piping joint downstream of the RCES-operated regulator station where pressure is reduced to 5 psig or less for introduction into a customer’s building or a customer’s low pressure distribution system. In cases of jurisdictional dispute, the more conservative Standard shall apply.
- F. All HPG and MPG systems are, by definition, under the jurisdiction of Reedy Creek Energy Services, Inc. for engineering, operation and maintenance.

104 OFFICERS AND DUTIES

- A. The “RCES Gas Engineer” shall normally be the RCES Principal Mechanical Engineer (or his designate) who shall be a Registered Engineer in the State of Florida. The RCES Gas Engineer shall have the following duties, responsibility and authority:
 - 1. Review and approval authority of all design of HPG and MPG systems within the jurisdictional boundaries of RCID.

2. Inform the Florida Public Service Commission of all new construction as required by law.
 3. Review and approval authority of construction submittals of materials and methods to verify compliance with the Standard, contract documents, and RCES policy. The RCES Gas Engineer shall be the final authority in determining what submittals are required.
 4. Resolve disputes regarding jurisdiction, design, materials and methods between any and all parties to a MPG and/or HPG construction project. The RCES Gas Engineer shall have final authority in this regard.
 5. Verify that all documents required for permanent record of new construction have been submitted and are on-file in compliance with the Florida Public Service Commission Rules and Regulations.
 6. Verify that RCES construction inspection duties are properly performed and that inspection duties delegated to contractors or Owner's Representatives are also properly performed.
 7. Perform additional functions and services as required to verify RCES compliance with all Federal and State statutes, rules and regulations in support of the protection of life and property.
- B. The "RCES Inspector" shall normally be a mechanical inspector who is a member of the RCES Project Management Department. The RCES Inspector shall have the following duties, responsibility and authority:
1. Monitor the progress of construction and verify that the materials and methods are in compliance with the project plans, specifications and with the RCES Standard.
 2. Inform the RCES Gas Engineer of all non-conforming conditions existing on the job-site. Execute the RCES Gas Engineer's instructions to correct non-conformance conditions.
 3. Coordinate the activities of contractors, engineers, the RCES Gas Department and other entities to verify proper construction methods, materials and safety.
 4. Perform inspection duties including but not limited to; holiday-testing; material inspection; pressure-testing; tie-in monitoring; leak-checking; documentation; welder-certification compliance and such other duties as may from time-to-time be required for the verification of proper installation of the service.

5. The RCES Inspector shall have the authority to halt any and all HPG and MPG construction activities in part or in whole if in his judgement continuing work would result in conditions unsafe for either life or property or if continued work would result in a quality of work that is not in compliance with the Standard, and/or project plans or specifications.
 6. The RCES Project Management Department shall have the responsibility for verifying that contractors performing covered work have anti-drug programs in compliance with USDOT Part 199.
- C. The “RCES Gas Department” is composed of a group of specially-trained and experienced natural gas distribution system technicians whose duties include the operation and maintenance of all of the HPG and MPG natural gas systems owned by RCID and operated by RCES including metering, regulation, leak detection, and cathodic protection. The RCES Gas Department shall have the following duties, responsibility and authority:
1. Perform tie-ins of new construction to existing lines when determined to be necessary for system security. Said determination shall be the responsibility of the “RCES Gas Utility Services Manager”.
 2. Monitor the tie-in work of contractors to verify safe purging and venting. Assist the RCES Inspector, when requested, in the work of tie-ins, pressure-testing, cleaning and pigging. Schedule and coordinate all gas system outages.
 3. Provide and install meter/regulator sets per contract requirements in a timely manner.
 4. Verify that new systems are ready to receive gas and once the verification is complete, introduce gas into new systems when requested. Work with the RCES inspector to identify deficiencies in sufficient time so that corrective action can be taken in a timely manner. Monitor or perform, as required, the work of purging gas from existing lines to facilitate construction work.
 5. Perform test of pipeline bonding and dielectric isolation at the appropriate time in the construction schedule and in coordination with the RCES Inspector.
 6. Maintain final records of construction materials as required by law.

7. The RCES Gas Department shall have the authority to refuse to admit gas into any system or pipeline for cause. Corrective action shall be coordinated by the RCES Inspector.

200 MATERIALS

201 GENERAL REQUIREMENTS FOR COMPONENTS

Material for pipe and components must be:

- A. Able to maintain structural integrity of the pipeline under all temperature and other environmental conditions that may be anticipated.
- B. Chemically compatible with the natural gas that will be transported and with any other material in the pipeline with which they are in contact.
- C. Qualified in accordance with the applicable requirements of MFSS Part 192.
- D. Each component of a pipeline must be able to withstand operating pressures and other anticipated loading with unit stresses equivalent to those allowed for comparable materials in piping in the same location and kind of service.

202 PIPE

All steel pipe used for the construction of mains and service shall meet the minimum standards of API 5L Grade B or ASTM A53 Grade B, ERW or Seamless, with a minimum yield strength of not less than 35,000 psi or greater than 42,000 psi. Pipe of unknown origin shall not be used for any service or at any location.

203 MARKING OF MATERIALS

Each valve, length of pipe, or other component must be marked as prescribed in:

- A. The specification or standard to which it was manufactured or MSS Standard Practice SP-25.
- B. Field die stamping on any surface subject to internal stress is prohibited.

204 VALVES – MAINS

Valves must meet the minimum requirements of API-6D and Table 216 of this Standard.

205 VALVES – SERVICE LINES

- A. Service line valves must be able to control the flow of gas when subjected to exposure of anticipated heat. Soft seat valves which would be adversely affected by heat are prohibited.
- B. Service line valves must be designed to minimize removal of the core of the valve without the use of specialized tools.
- C. Each service line must have a service line valve that meets Part 192.363 and Subparts B and D of Part 192. A valve incorporated in a meter bar, that allows the meter to be bypassed, may not be used as a service line valve.

206 FLANGES AND FLANGE ACCESSORIES

- A. Each flange must meet the minimum requirements of ASTM A181, ANSI B16.5 or MSS-SP44 or the equivalent.
- B. Each flange assembly must be able to withstand the maximum pressure at which the line is to be operated and to maintain its physical and chemical properties at any temperature to which it is anticipated it might be subjected to in service.

207 STANDARD FITTINGS

- A. The minimum metal thickness of threaded fittings may not be less than specified for the pressures and temperatures referenced, in these Standards, or their equivalent.
- B. Each steel butt-weld and socket-weld fitting must have pressure and temperature ratings based on stresses for pipe of the same or equivalent materials. The actual bursting strength of the fitting must at least equal the computed bursting strength of pipe of the designated material and wall thickness, as determined by a prototype that was tested to at least the pressure required for the pipeline to which it was added.

208 TAPPING FITTINGS

Each mechanical fitting used to make a hot tap must have a minimum rating of the test pressure of the pipeline.

209 MATERIAL USED FOR INSTRUMENT, CONTROL AND SAMPLING CONNECTIONS

- A. Any component employed must meet the particular conditions of service and be able to withstand the maximum service and pressure of the pipe or equipment to which it is attached.
- B. Brass or copper material shall not be used for metal temperatures exceeding 400 degrees Fahrenheit.

210 METERING AND REGULATION

Each newly installed meter manufactured after November 12, 1970 must have been tested to a minimum of 10 psig or to the pressure at which it is intended to operate (MAOP), whichever is greater.

211 MATERIAL RECORDS

Records shall be kept sufficient to prove that all materials and components used or intended to be used in the gas pipeline meet the applicable specifications listed in these rules or adopted standards. All records will be maintained by the RCES Gas Department.

212 INSPECTION OF MATERIALS

Each length of pipe and each other component must be visually inspected at the site of installation to verify that it has not sustained any visually determinable damage that could impair its serviceability. This inspection is to be performed by the RCES Inspector.

213 TRANSPORTATION OF PIPE

In a pipeline to be operated at a hoop stress of 20 percent or more of SMYS, no operator may use pipe having an outer diameter to wall thickness ratio of 70 to one, or more, that is transported by railroad unless that transportation was performed in accordance with API RP 5P1 or by truck unless that transportation was performed in accordance with API RP 5LT as referenced in the MFSS.

214 NON-STEEL PIPE

Plastic, cast-iron, ductile iron, copper and aluminum pipe will not be installed for use as mains or services in medium and high pressure RCID systems.

215 USED PIPE

Used pipe will not be installed for use as mains or services.

216 VALVES FOR MAINS AND SERVICES

The following valves are the basis of design for the Reedy Creek HPG and MPG systems. Alternative valves may be used with the written approval by the RCES Gas Engineer. Written approval must be granted prior to purchase or installation of any alternative valve.

BELOW GRADE

Kerotest 1WS2, Weld end: Sizes 2" through 6"
Kerotest 1WS5, Weld end: Sizes 2" through 6"
Kerotest 1WL7, Weld end: Sizes 3" through 16"
Kerotest 1F2, Flanged: Sizes 2" through 12"
Kerotest Weldball, Flanged, Class 150, Reduced Port: Sizes 2" through 12":
Kerotest Weldball, Flanged, Class 300, Reduced Port: Sizes 2" through 8":
Kerotest Weldball, Weld end, Class 150, Reduced Port: Sizes ¾" through 12"
Kerotest Weldball, Weld end, Class 300, Reduced Port: Sizes ¾" through 8"
Kerotest Weldball, Flanged, Class 150, Full Port: Sizes 2" through 10":
Kerotest Weldball, Flanged, Class 300, Full Port: Sizes 2" through 8":
Kerotest Weldball, Weld end, Class 150, Full Port: Sizes 2" through 10"
Kerotest Weldball, Weld end, Class 300, Full Port: Sizes 2" through 8"
Mueller No-Blo Curbstop H-17800: Sizes 1", 1-1/4" and 2"
Mueller No-Blo Service Tee H-17500: Sizes ¾" though 2"
Mueller No-Blo Service Tee H-17501: Sizes ¾" though 2"
Mueller No-Blo Service Tee H-17503: Sizes 1-1/4", 3" and 4"
Mueller Autoperf Tee H-18101: Sizes ½" though 1"
Mueller Autoperf Tee H-18102: Sizes ½" though 1"

ABOVE GRADE

Kerotest Weldball, Flanged, Class 150, Reduced Port: Sizes 2" through 12":
Kerotest Weldball, Flanged, Class 300, Reduced Port: Sizes 2" through 8":
Kerotest Weldball, Weld end, Class 150, Reduced Port: Sizes ¾" through 12"
Kerotest Weldball, Weld end, Class 300, Reduced Port: Sizes ¾" through 8"
Kerotest Weldball, Flanged, Class 150, Full Port: Sizes 2" through 10":
Kerotest Weldball, Flanged, Class 300, Full Port: Sizes 2" through 8":
Kerotest Weldball, Weld end, Class 150, Full Port: Sizes 2" through 10"
Kerotest Weldball, Weld end, Class 300, Full Port: Sizes 2" through 8"
Mueller H-11175G, Threaded: Sizes ½" through 2"
Mueller H-11179G, Threaded and Insulated: Sizes ¾" through 1-1/4"
Mueller Centurion II, Threaded and Insulated: Sizes ¾" and 1"

300 DESIGN AND INSTALLATION – NEW CONSTRUCTION

301 WELDED BRANCH CONNECTIONS

Each welded branch connection made to pipe in the form of a single connection or manifold as a series of connections must be designed so that the strength of the pipe is not reduced.

302 FLEXIBILITY

Each pipeline must be designed with enough flexibility to prevent thermal expansion or contraction from causing excessive stresses in the pipe or components, excessive bending or unusual loads at joints, or undesirable forces or movements at points of connection to equipment, or at anchorage or guide points.

303 DIRECTIONAL DRILLING CONSIDERATIONS

When designing and/or installing underground gas piping that will be installed using horizontal directional drilling methods, extreme care shall be exercised such that at no time will a minimum bend radius be achieved that will result in a pipe stress greater than 20% SMYS.

304 SUPPORTS AND ANCHORS

- A. Each pipeline and its associated equipment must have enough anchors or supports to:
 - 1. Prevent undue strain on connected equipment;
 - 2. Resist longitudinal forces caused by bending or offsets in the pipe, and
 - 3. Prevent or damp out excessive vibration.

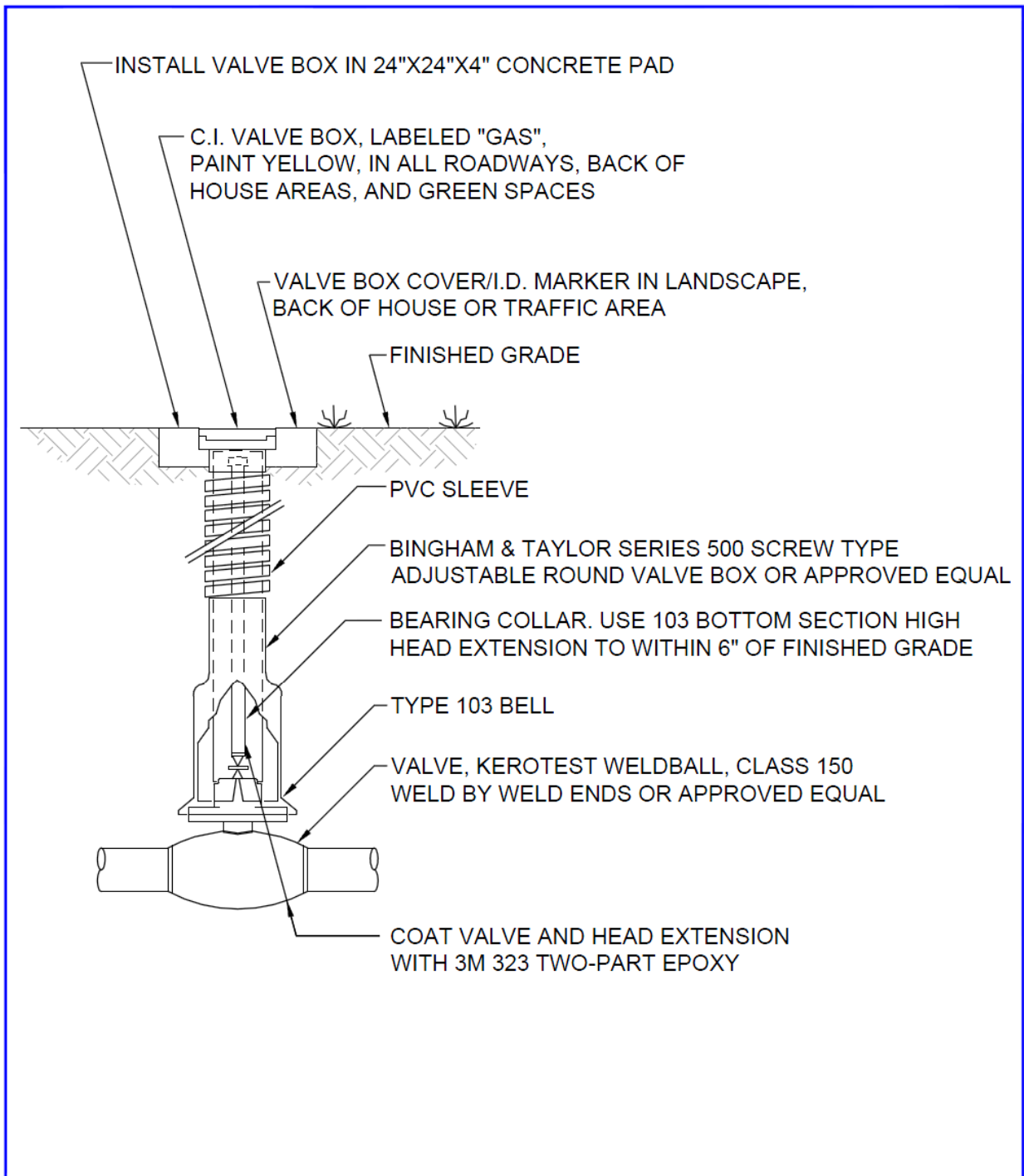
- B. Each pipeline and its associated equipment must have enough anchors or supports to protect the exposed pipe joints from the maximum end force caused by internal pressure and any additional forces caused by temperature expansion or contraction or by the weight of the pipe and its contents.



- C. Each support or anchor on an exposed pipeline must be made of durable, noncombustible material and must be designed and installed as follows:
 - 1. Free expansion and contraction of the pipeline between supports or anchors may not be restricted.
 - 2. Provisions must be made for the service conditions involved.
 - 3. Movement of the pipeline may not cause disengagement of the support equipment.

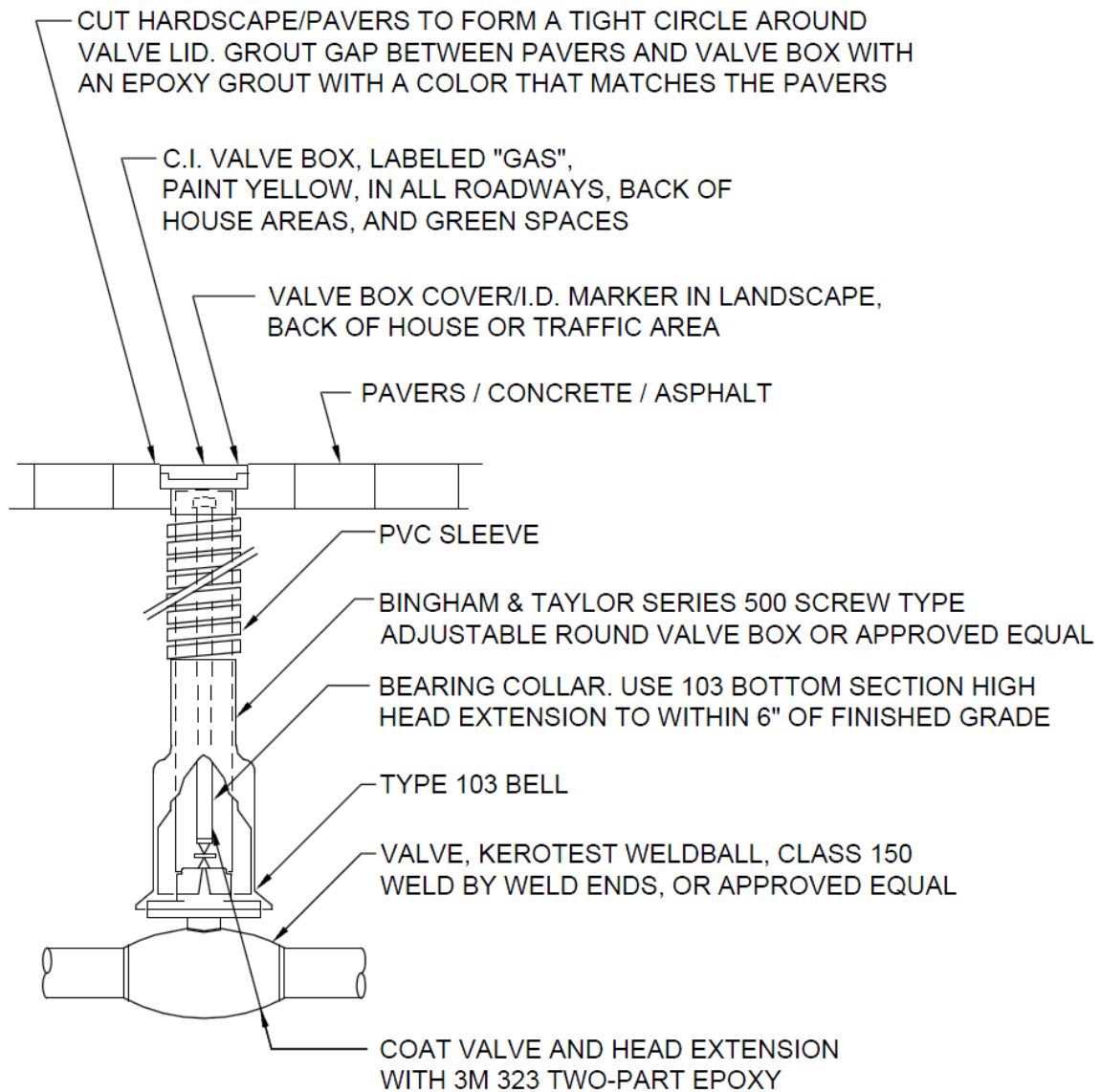
4. To prevent cathodic protection system shorts and any other impairment of the corrosion protection system.
 5. To keep the pipeline system electrically isolated from all sources of stray currents that are not part of any corrosion protection system.
- D. Each underground pipeline that is connected to a relatively unyielding line or other fixed object must have enough flexibility to provide for possible movement, or it must have an anchor that will limit the movement of the pipeline.
- E. Each underground pipeline that is being connected to new branches must have a firm foundation for both the header and the branch to prevent lateral and vertical movement.

305 DISTRIBUTION LINE VALVES

- A. Only approved valves shall be used in underground service. See Section 216.
- B. Anticipated operating conditions shall be considered in the selection of valves.
- C. Each medium and high pressure distribution system must have valves spaced so as to reduce the time to shut down a section of main in an emergency. The valve spacing is determined by operating pressure, the size of the mains, and the local physical conditions.
- D. Each regulator station controlling the flow or pressure of gas in the distribution system must have a valve installed on the inlet piping at a distance from the regulator station sufficient to permit the operation of the valve during an emergency that might preclude access to the station. These valves are to be installed at a safe distance from the station, but no more than 500 feet from the regulator station.
- E. Each valve on a main installed for operating or emergency purposes must comply with the following:
1. The valve must be placed in a readily accessible location so as to facilitate its operation in an emergency.
 2. The operating stem or mechanism must be readily accessible by being equipped with a 2" square operating head extended to within 6" of finish grade. The operating head shall have proper indicating markings showing operating position of the valve. The operating head must be equipped with an extended lubricating nipple so that the valve, if buried, can be lubricated from the surface. See Details 301 and 302.




 ACES <small>REEDY CREEK ENERGY SERVICES</small> Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	ISOLATION GAS VALVE DETAIL INSTALLED IN GREEN SPACES			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	FIGURE:			301
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ISSUE	APPR	DATE	ISSUED FOR	




Mechanical Engineering Department
 (407) 824-4943, P.O. BOX 10000,
 Lake Buena Vista Florida 32830-1000
 Certificate of Authorization No. 27841

ISOLATION GAS VALVE DETAIL INSTALLED IN HARDSCAPE SPACES			
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DESIGNED FOR:



REEDY CREEK
IMPROVEMENT DISTRICT

FIGURE:
302

3. If the valve is equipped with a grease fitting, a valve grease extension shall be fabricated from ¼" diameter schedule 80 pipe. Larger diameters can be fabricated from schedule 40 pipe.
4. All lubricated valves shall be flushed with the appropriate manufacturer's grease before installation and re-greased after installation as required to affect sealing. All valves equipped with extended lubrication nipples shall have extensions filled with the appropriate grease before installation of the valve.
5. The valve, flanges, appurtenances, operator extension and lubricating stem extension must be coated with approved mastic to prevent corrosion. See section 1800 for specific requirements.
6. If the valve is installed in a buried box or enclosure, the box or enclosure must be installed so as to avoid transmitting external loads to the main. The box must also have a plastic insert to avoid cathodic protection system shorts between the piping system and the enclosure or box.

F. Sectionalizing Valves

Valves shall be spaced within each distribution system to reduce the time required for evacuating gas from the section. In determining the spacing of these valves, the following factors shall be evaluated:

1. Volume and pressure of gas between valves
2. Number and size of any blowdown points between valves
3. Size of area and population density between valves required to isolate the area as well as the accessibility of the required valves
4. Time required for removal of gas between valves in the event of an emergency and the minimum number of personnel required to shut-down and restore the area
5. Other means and availability of required equipment to control the flow of gas in the event of an emergency
6. The number and type of customers, such as hospitals, schools, commercial and industrial loads, etc., that will be affected

- G. In a high pressure gas distribution system where gas is supplied through a service line 2 inches or larger in diameter to a shopping center, school, church, industrial plant or other building where 25 or more people may normally be expected to reside or congregate and the service line valve is within 50 feet of the building served, a shut-off valve must be installed on the service line 100 feet from the point the service line enters the building being served in a recognizable location for emergency function.

306 BENDS AND ELBOWS

- A. Each field bend in steel pipe, other than a wrinkle bend must comply with the following:
1. A bend may not impair the serviceability of the pipe.
 2. On a pipe containing a longitudinal weld, the longitudinal seam must be as near as practicable to the neutral axis of the bend.
 3. For pipe more than 4" in nominal diameter, the difference between the maximum and minimum diameter at a bend may not be more than 2-1/2% of the nominal diameter.
- B. Each circumferential weld of steel pipe that is subjected to stress during bending must be nondestructively tested.
- C. Wrought-steel welding elbows and transverse segments of these elbows may not be used for changes in direction on steel pipe that is 2" or more in diameter unless the arc length, as measured along the crotch, is at least 1".
- D. Each bend, other than a wrinkle bend, must have smooth contour and be free of mechanical damage.

307 WRINKLE BENDS

Wrinkle bends are prohibited.

308 EXTRUDED OUTLETS

Each extruded outlet must be suitable for the anticipated service conditions and must be at least equal to the design strength of the pipe and other fittings in the pipeline to which it is attached.

309 UNDERGROUND CLEARANCE

Each main must be installed with enough clearance from any other underground structure to allow proper maintenance and to protect against damage that might result from proximity to other structures. Minimum clearance for mains shall be 12" in all planes unless otherwise approved by the RCES Gas Engineer.

310 COVER

- A. Mains shall be installed with a minimum of 36" of cover. This may be reduced to not less than 24" by approval of the RCES Gas Engineer when specific conditions prevent 36" of cover.
- B. Mains may be installed with less cover when adequate protection from damage is provided and when approved by the RCES Gas Engineer.

311 CASING

- A. All casings must be fabricated from schedule 40 steel pipe unless otherwise specified by the RCES Gas Engineer.
- B. The casing must be designed to withstand all superimposed loads.
- C. If there is a possibility of water entering the casing, the casing ends must be sealed.
- D. If the ends of an unvented casing are sealed and the sealing is strong enough to retain the maximum allowable operating pressure of the pipe, the casing must be designed to hold this pressure at a stress level of not more than 72% of SMYS.
- E. Vents installed on casings must be protected from the weather to prevent water from entering the casing.
- F. Use of casings shall be minimized to only those required due to unusual superimposed loads, bridge crossings where the main is encased in the bridge structure, or boring and jacking where the main cannot serve as the jacked casing.

312 PROTECTION FROM HAZARDS

- A. Each distribution main and associated components must be protected from any hazard that would cause the pipe to move to sustain abnormal loading.
- B. Each distribution main and associated components that are constructed above ground must be protected from accidental vehicular traffic or other similar causes, either being placed a safe distance from traffic or by installing bollards.

313 INSTALLATION OF PIPE IN TRENCH– GENERAL

- A. When installed in the trench, each pipeline must be installed so that the pipe fits the ditch so as to minimize stresses and protect the pipe coating from damage.
- B. Trenches for a pipeline must be backfilled in a manner that:
 - 1. Provides firm support under the pipe and;

2. Prevents damage to the pipe and coating from equipment or from the backfill material.

314 PIPE AND PIPELINE COMPONENT DESIGN

A. Scope:

The scope of this section is to establish the procedures for design of pipe and pipeline components which satisfy the minimum requirements specified in the MFSS. Pipe must be designed with sufficient wall thickness or with adequate protection to withstand anticipated external pressures and loads that will be imposed on the pipe after installation.

In the event that a conversion of any propane system is contemplated, a conversion procedure will be established.

- B. No threaded joints will be allowed on pipe which will be installed underground.
- C. Mains and service lines to operate at 175 psig or less.
- D. Design Formula for Steel Pipe:

The design pressure for steel pipe is determined in accordance with the following formula:

$$P = (2St/D)*F*E*T$$

Where:

P = Design pressure in pounds per square inch gauge.

S = Yield strength in pounds per square inch determined in accordance with MFSS 192.107.

D = Nominal outside diameter of the pipe in inches.

t = Nominal wall thickness of the pipe in inches. If this is unknown, it shall be determined in accordance with MFSS 192.109.

F = Design factor determined in accordance with MFSS 192.111.

E = Longitudinal joint factor determined in accordance with MFSS 192.113.

T = Temperature derating factor determined in accordance with MFSS 192.115.

- E. If steel pipe that has been cold-worked to meet the SMYS is heated, other than by welding, to 600 degrees Fahrenheit or more, the design pressure is limited to 75% of the pressure determined under paragraph 313 D of this Standard. Assuming the worst conditions for the design formula using the following values will yield a design pressure of 352 psig.

$$S = 24,000 \text{ psi}$$

$$D = 4.0 \text{ inches}$$

$$t = 0.188 \text{ inches}$$

$$F = 0.40$$

$$E = 0.60$$

$$T = 0.867$$

$$P = (2 * 24000 * 0.188/4.0) * 0.40 * 0.60 * 0.867 * 0.75 = 352 \text{ psig}$$

315 YIELD STRENGTH FOR STEEL PIPE

SPECIFIED MINIMUM YIELD STRENGTH

SPECIFICATION UNDER WHICH PIPE IS MANUFACTURED	GRADE OR CLASS OF PIPE	SYSTEM APPLICATION	SMYS (PSI)
API 5L Types S&E	Grade A25, Class I	MPG Only	25,000
	Grade A25, Class II	MPG Only	25,000
	Grade A	MPG Only	30,000
	Grade B	MPG & HPG	35,000
ASTM A53 Types S&E	Grade A	MPG Only	30,000
	Grade B	MPG & HPG Only	35,000
ASTM A106	Grade A	MPG Only	30,000
	Grade B	MPG & HPG	35,000
	Grade C	MPG & HPG	40,000

The yield strength of the pipe shall not exceed 42,000 psi.

316 NOMINAL WALL THICKNESS (t) FOR STEEL PIPE

The following table specifies the minimum wall thickness and grades of steel pipe that may be acceptable under specific design conditions. The table also specifies the normal wall thickness and grades of steel pipe that is the RCID Standard in this system. All proposed deviations from the standard wall thickness and grade must be documented and justified on a case-by-case basis to the RCES Gas Engineer.

NOMINAL SIZE	MINIMUM WALL THICKNESS (inches)	MINIMUM GRADE	RCES STANDARD WALL THICKNESS (inches)	RCES STANDARD GRADE
1/2	0.109	Class I/Grade B	0.109	Grade B
3/4	0.113	Class I/Grade B	0.113	Grade B
1	0.133	Class I/Grade B	0.133	Grade B
1-1/4	0.140	Class I/Grade B	0.140	Grade B
1-1/2	0.145	Class I/Grade B	0.145	Grade B
2	0.154	Class I/Grade B	0.154	Grade B
2-1/2	0.203	Class I/Grade B	0.203	Grade B
3	0.188	Class I/Grade B	0.216	Grade B
4	0.188	Class I/Grade B	0.237	Grade B
5	0.188	Class I/Grade B	0.258	Grade B
6	0.188	Class I/Grade B	0.280	Grade B
8	0.188	Class I/Grade B	0.322	Grade B
10	0.250	Class I/Grade B	0.365	Grade B
12	0.250	Class I/Grade B	0.375	Grade B

If the nominal wall thickness for steel pipe is not known, it is determined by measuring the thickness of each piece of pipe at quarter points on one end. However, if the pipe is of uniform grade, size and thickness and there are more than ten (10) lengths, only 10 percent of the individual lengths, but not less than ten (10) lengths shall be measured. The thickness of the lengths that are not measured must be verified by applying a gage set to the minimum thickness found in commercial specifications that is below the average of all measurements taken. The nominal wall thickness used may not be more than 1.14 times the smallest measurement taken on pipe less than 20 inches in diameter.

317 DESIGN FACTOR (F) FOR STEEL PIPE

The maximum operating pressure shall normally be based on a design factor value or 0.40. Any deviations or exceptions to this shall be made in accordance with the following table:

VALUE OF DESIGN FACTOR (F)	
CLASS LOCATION	DESIGN FACTOR
CLASS 1	0.72
CLASS 2	0.60
CLASS 3	0.50
CLASS 4	0.40

Descriptions of class locations are given in MFSS 192.5.

318 LONGITUDINAL JOINT FACTOR (E) FOR STEEL PIPE

The longitudinal joint factor for API 5L seamless pipe used in the system is 1.0. Other joint factors are given in MFSS 192.113. The only allowable longitudinal joints are ERW, seamless and submerged arc.

319 TEMPERATURE DERATING FACTOR (T) FOR STEEL PIPE

The temperature derating factors for steel pipe are given in the following table:

VALUE OF DESIGN FACTOR (T)	
TEMPERATURE DEG F	TEMPERATURE DERATING FACTOR (T)
250 or less	1.000
300	0.967
350	0.933
400	0.900
450	0.867

320 COMPONENTS FABRICATED BY WELDING

- A. Except for branch connections and assemblies of standard pipe, pipe fittings joined by circumferential (girth) welds, the design pressure of each component fabricated by

welding, whose strength cannot be determined, must be established in accordance with paragraph UG-101 of Section VIII of the ASME Boiler and Pressure Vessel Code.

- B. Each prefabricated unit that uses plate and longitudinal seams must be designed, constructed and tested in accordance with the ASME Boiler and Pressure Vessel Code, except for the following:
 - 1. Regularly manufactured butt-weld fittings
 - 2. Pipe that has been produced and tested under a specification listed in MFSS 192
 - 3. Partial assemblies such as split rings or collars.
 - 4. Prefabricated units that the manufacturer certifies have been tested to at least twice the maximum pressure to which they will be subjected under the anticipated operating conditions
- C. Orange-peel bull plugs and orange-peel swages may not be used.
- D. Except for flat closures designed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code, flat closures and fish tails may not be used.

321 ABANDONMENT OF GAS PIPING

All underground gas lines that are abandoned shall be filled with water, or other inert material with prior written approval from the RCES Gas Engineer. All open ends permanently sealed with pipe caps, welded plugs, or flanges. All above ground abandoned gas lines shall be removed. This section does not apply to gas lines with a prospect for reuse.

400 MAINS – NEW CONSTRUCTION

401 SCOPE

This section covers the construction of new steel mains 1” through 12” designed to operate at pressures up to and including 175 psig. This Standard includes the specifications for planning the construction, fabrication and assembly, installation and pressure testing of steel gas mains. Additional requirements are located in Standard 300 for Design and Installation – New Construction.

402 MATERIAL

The material requirements for mains shall be in accordance with Standard 200.

403 PREPARATION PRIOR TO CONSTRUCTION

A. General

The location of the main shall be determined by the design engineer subject to approval by the RCES Gas Engineer and the governing authorities having jurisdiction. Detailed drawings and specifications shall be furnished to the RCES Gas Engineer and the RCES Gas Department no later than thirty (30) days prior to the start of construction.

B. Line of Main

The installation of offsets from one location to another shall be kept to a minimum. An offset, if required, shall be made within the shortest length practical. Deflections in steel mains shall be made with socket-welded steel elbows, butt-welded steel elbows or cold smooth bends.

C. Railroad Crossings

A casing shall be installed under railroads from right-of-way to right-of-way. Mains installed in railroad right-of-ways shall conform to the requirements of that railroad company and/or the authority having jurisdiction. Spacers are to be clamped to the pipe to be inserted (carrier pipe) to prevent contact with the casing and the ends shall be sealed to prevent entry of water or foreign material. The casing shall also be vented and designed to withstand superimposed loads.

D. Highway and Roadway Crossings

A casing shall be installed under highways and roadways when specified by the design engineer and approved by the RCES Gas Engineer. Casings shall meet the requirements of Standard 403 C.

E. Exposed Main Crossings (Bridges and Overpasses)

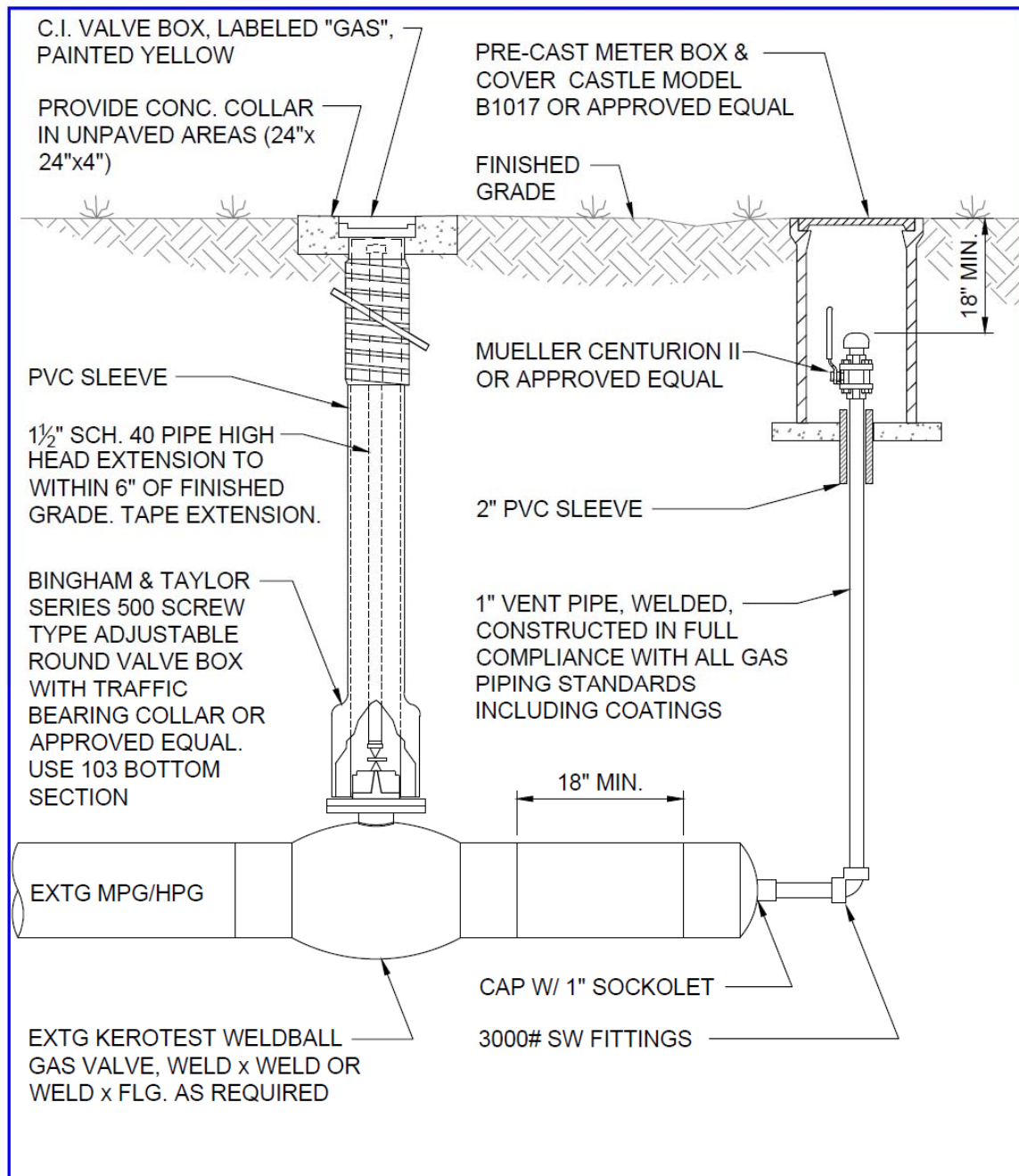
Steel pipe shall be used for all exposed main crossings. The use of expansion joints to prevent excessive stresses in the main shall be used only when specified by the design engineer and approved by the RCES Gas Engineer.



F. Coating

Steel pipe is specified for construction and it shall be coated to conform to the requirements of the Standards herein.

G. Main Terminus

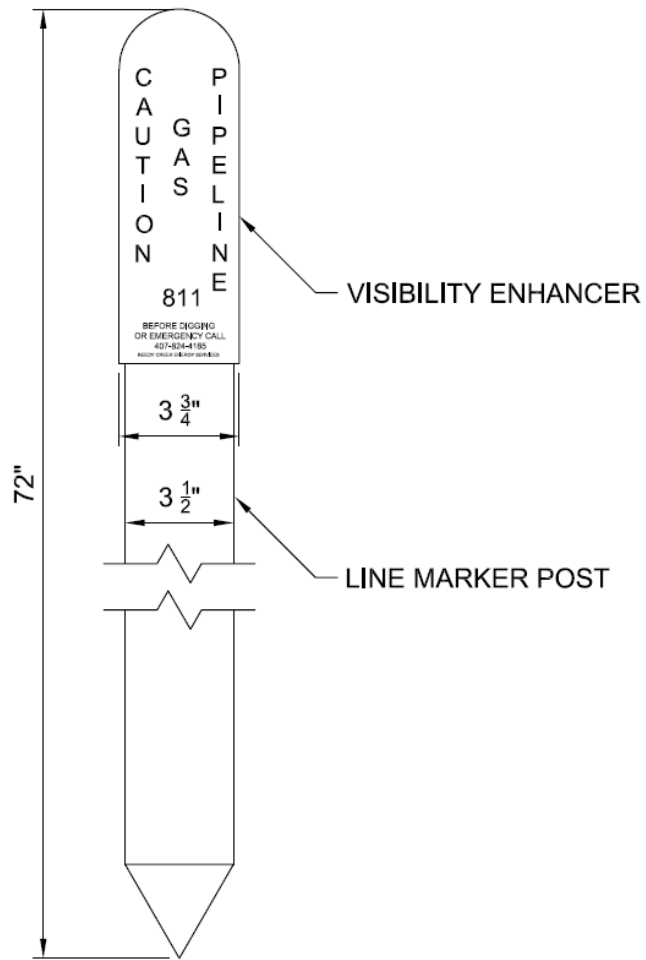
Dead ends shall be avoided whenever possible. Where required, dead ends of steel mains may be terminated with a weld cap or flange as specific job conditions require. The blind flange or weld cap shall be equipped with a blow-down mounted in its face. The blow-down shall be routed to a blow-down valve mounted in a grade box. See Detail 401.



 Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	MAIN TERMINUS VENT DETAIL			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	2			FIGURE:
	1			401
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H. Gas Main Identification Markers

1. See to Detail 402.
2. Private Right-of-way Easements:
 - a. Markers shall be located at the fence between abutting owners and 18" from the main.
 - b. At locations specified by the RCES Gas Engineer.
 - c. At locations specified by the RCES Gas Department.
3. Public Right-of-way Easements:
 - a. In non-urban areas, the markers shall be located:
 - i. At one side of all intersecting road crossings.
 - ii. At all points where the main crosses to the other side of the right-of-way
 - iii. At locations specified by the RCES Gas Engineer.
 - iv. At locations required by the RCES Gas Department.



NOTES:

1. SIGNS TO BE ORIENTED PARALLEL TO HIGHWAY CENTERLINE.
2. MARKER POST AND VISIBILITY ENHANCER SHALL BE CARSONITE CLM-072-01-18-02.
3. POST SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. DECALS SHALL BE SUPPLIED BY RCES GAS DEPARTMENT. CONTACT CARLOS MARTINEZ AT 407-560-6050 TO OBTAIN DECALS AND FOR COORDINATION.

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	6				FIGURE: <div style="text-align: center; font-size: 24pt; font-weight: bold;">402</div>
	5				
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I. Permits

Where required by local governing authorities, permits, letters of intent, etc. shall be obtained by the RCES Gas Engineer or other designated representative of RCID.

J. Special Instructions

Instructions of a special nature relative to the installation of a specific main order shall accompany the main order to the field. These instructions may include such items as: time and duration of working hours due to traffic conditions, instructions as to specific notifications to other interested parties, special backfill instructions, etc.

404 INSTALLATION AND FABRICATION

A. Joints – Approved Methods

1. Steel Mains

- a. Welded Joints – Steel pipe, fittings and appurtenances shall be joined by welding wherever practical.
- b. Flanged Joints – Flanges cast or forged as an integral part of regulators, valves and equipment, or weld neck and slip-on flanges may be used.

B. Bends and Deflections

Bends and deflections in pipe may be made by using one of the following approved methods, subject to the design policies of Standard 403 B and Standards 305 and 306.

1. Butt-weld Elbows

Steel butt weld elbows and forged socket-weld elbows shall be used as the preferred method on all steel gas main construction.

2. Compression Joint Couplings

The use of compression joint couplings is not permitted without prior approval by the RCES Gas Engineer except in certain conditions where temporary use of compression fittings may be used to temporarily restore a gas main to service until permanent repairs can be made.

C. Branch Connections

1. Steel Mains

Branch connections on steel mains shall be made using a weld-o-let, sock-o-let, a tapping tee, or a straight weld tee or the equivalent of the above.

D. Reducers

1. Steel Mains

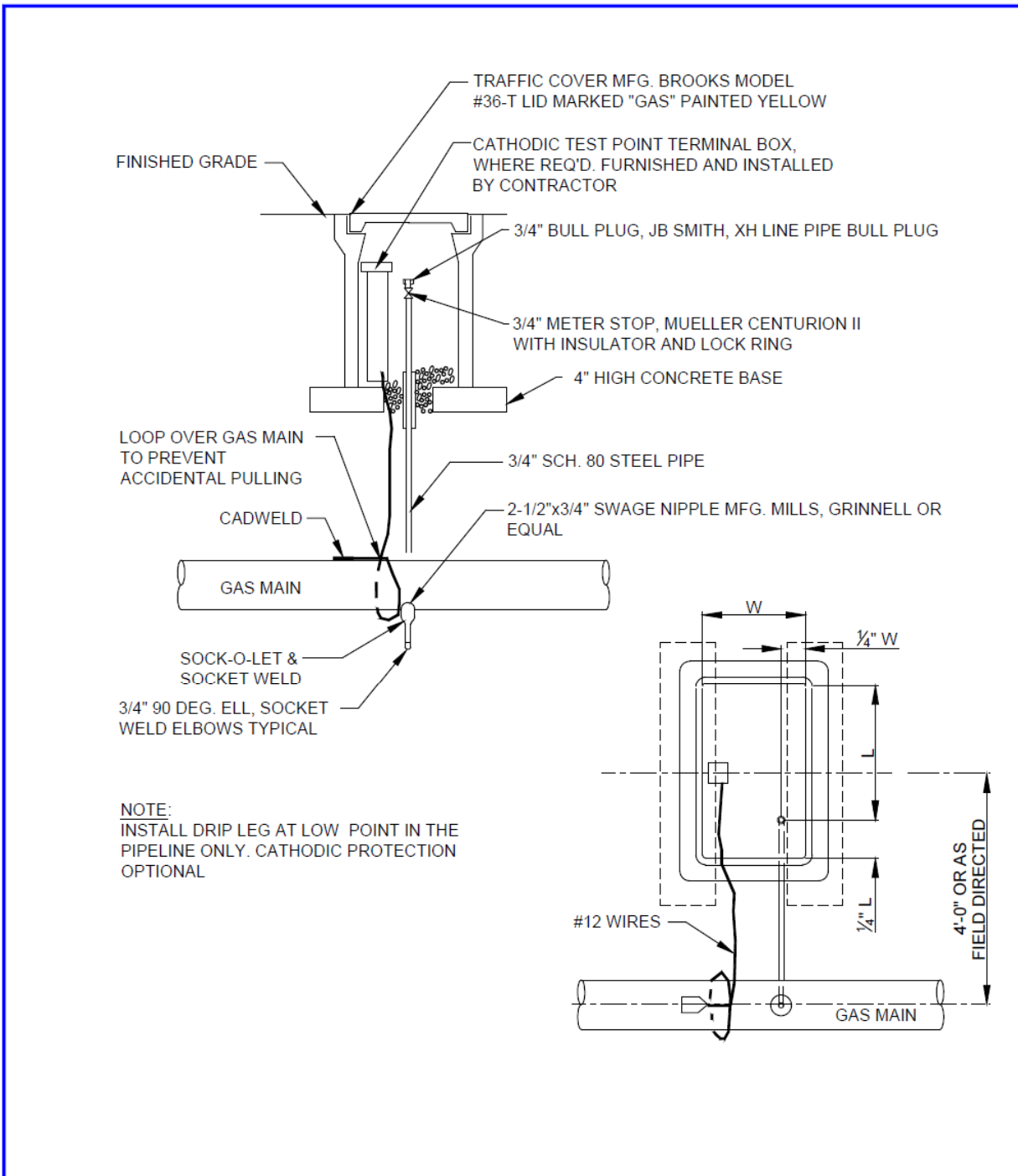
- a. Reduction in size on steel mains shall be made using steel butt-weld and socket-weld concentric reducers. A reducing butt-weld 90 degree elbow may be used where a change in direction is required.
- b. Eccentric reducers may be used only with prior approval by the RCES Gas Engineer.
- c. Reducing compression couplings may be used only as transition fittings from steel to plastic mains on with prior approval by the RCES Gas Engineer.



E. Valves

Sectionalizing, branch control valves, and regulator vault inlet and outlet valves, where required, shall be specified as to type, size and location by the RCES Gas Engineer.

F. Drip Legs

Drip Legs shall be installed as specified by the design engineer and approved by the RCES Gas Engineer. See Detail 403 for additional requirements.



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405 EXCAVATION, INSTALLING AND BACKFILLING

A. Excavating

1. Trenches shall be prepared as specified in Standard 500 to provide for the safe, convenient handling and laying of mains. All trenches shall meet all applicable requirements of OSHA.
2. Bell-holes for tie-ins, bleeder-end and auguring shall be excavated in accordance with governmental standards to provide a safe working area for the construction crew and the public.
3. Trenches shall be free of welding rods, rocks, rubble, brush and other foreign material. The finished trench bottom shall be excavated so that the pipe will have smooth and continuous support.
4. Spoils should not be allowed to stand at the trench site overnight. Trenches should be backfilled at the end of the work day to a minimum depth of 12" T.O.P.
5. Adequate sheeting and shoring shall be installed to protect and maintain the stability of the walls of the trench.
6. The excavation shall be free of water when the main is laid, joined, tested and tied-in.
7. River, creek and drainage ditch crossings shall be excavated according to the grades shown on the drawings or as specified by the RCES Gas Engineer or RCES Inspector. Before the pipe is lowered the RCES Inspector must be supplied proof that the underwater trenches are adequate.

B. Installing

1. Materials Handling
 - a. The handling, loading, hauling, unloading and placing of pipe and piping materials shall be done in a manner which will avoid damage.
 - b. Steel pipe – Care shall be exercised to prevent damage to the pipe coating of all coated piping. Padded slings, calipers or special end hooks shall be used when handling mill coated pipe. Padded timbers or sand bags shall be provided on which to string pipe lengths so that each pipe is supported off the ground. The pipe is to remain on this blocking during the lineup and welding stage so as to not damage the coating.
 - c. No pipe shall be dropped, dragged, rolled or otherwise roughly handled.
2. Joints

- a. Welding of all steel piping shall be done in accordance with the welding procedures in this Standard by a qualified welder.
- b. At the request of the RCES Inspector or the RCES Gas Engineer any weld joint is subject to examination or test. It shall be removed from the line when necessary for the performance of the test.

3. Pipe Installation

- a. Pipe shall be supported over the trench on padded skids of sufficient size to safely support the pipe weight. Joint fabrication, joint wrapping, holiday testing and coating repair, where required, shall be done with the pipe in position over the trench.
- b. Pipe to be pulled over auger holes, casing or bores shall be full length and have as patch free a coating as possible. Special bullhead plugs shall be used to seal the pipe against entry of foreign material when main is inserted.
- c. The minimum clearance between underground gas piping where crossing or running parallel to other underground utilities should be a minimum of 12". If the minimum 12" distance cannot be maintained, an alternative method must be approved by the RCES Gas Engineer.
- d. The pipe shall be lowered into the trench with slings, calipers or by other means as approved by the RCES Inspector. These slings shall be removed from under the pipe without damaging the coating.
- e. All test wires, control points and all other corrosion facilities shall be installed in accordance with corrosion control requirements in this Standard.
- f. Pipe installed in the trench should not be left exposed overnight. It should be backfilled with a minimum cover of 12."
- g. Precaution must be taken at all times to prevent foreign material from entering the pipe or fittings. At the end of each day's construction or whenever the work is to be delayed for an extended period, the open ends must be securely plugged or capped with an internal "Nite Cap" or other means as approved by the RCES Inspector. Such cap shall prevent the entry of water, mud, etc. into the main.
- h. Prior to lining up and joining lengths of pipe, the interior of the pipe and fittings shall be thoroughly cleaned by using a swab, brush, compressed air or by pigging the main after installation. If a length of pipe is cut, the remainder, if over 30 inches in length, shall be beveled and welded into the line prior to the completion of the job.

- i. Valves, valve risers, valve boxes and other appurtenances such as pressure points, blow-down stacks and corrosion fittings shall be fabricated and tested as indicated on the construction drawings or as directed by the RCES Inspector or the RCES Gas Engineer.

4. Cathodic Protection

- a. Anodes, rectifiers, test points, insulating fittings and other corrosion control devices shall be installed as specified in the corrosion control section of this Standard.
- b. All piping, valves, valve appurtenances, regulators and other fittings shall be field coated as specified in the corrosion control section of this Standard.
- c. All mill coated pipe and all field joint wrappings shall be closely inspected for coating faults prior to lowering into the trench. Coating faults in thick film coatings shall be performed using a high voltage holiday detector that develops between 7,500 and 12,000 volts. Thin film coatings shall be holiday tested using a low voltage holiday tester developing between 1000 and 2000 volts (100 volts per mil). If instructed by the construction documents, the installing contractor shall supply the appropriate holiday detector and comply with the following; voltage output shall be bench-tested at least once per quarter or twice during a project's construction, which every is more frequent; the detector shall be equipped with the appropriate brushes and attachments so that the entire pipe surface can be tested; all holidays shall be repaired and tested.
- d. At the request of the RCES Gas Engineer, the main shall be tested for coating defects with a fault locator. It shall also be tested for electrical contacts utilizing the various electrical instruments designed for this purpose. For these tests, the main shall have been backfilled to a minimum cover of 12". Any coating defects or electrical contacts shall be uncovered and immediately repaired or eliminated.

5. Backfill

Trenches and other excavations shall be backfilled in accordance with Standard 600.

6. Testing

All new mains and appurtenances shall be tested in accordance with Standard 700. Tie-in connections will be made by the RCES Gas Department unless construction documents state otherwise. Tie-ins shall be soap-tested after the main is pressurized to normal operating pressures.

7. Purging

All mains shall be purged of the test medium before being placed into service.

8. Isolation

If new mains that will not be commissioned into service but which are otherwise complete are required to be connected to an existing system that is in service, shall be connected to the valve at the active main but separated by a “flange pancake” on the inactive steel, smooth faced, and equipped with an 8” handle. The newly completed but uncommissioned main shall be left pressurized with ~~between~~ a minimum of 20 psig but not more than ~~and~~ 40 psig of dry nitrogen.

9. Initiation of Service

Only the RCES Gas Department may initiate gas service into any new or recommissioned main.

10. Clean Up

When construction is completed, all material shall be removed from the site, and the area shall be restored to the condition existent previous to the work.

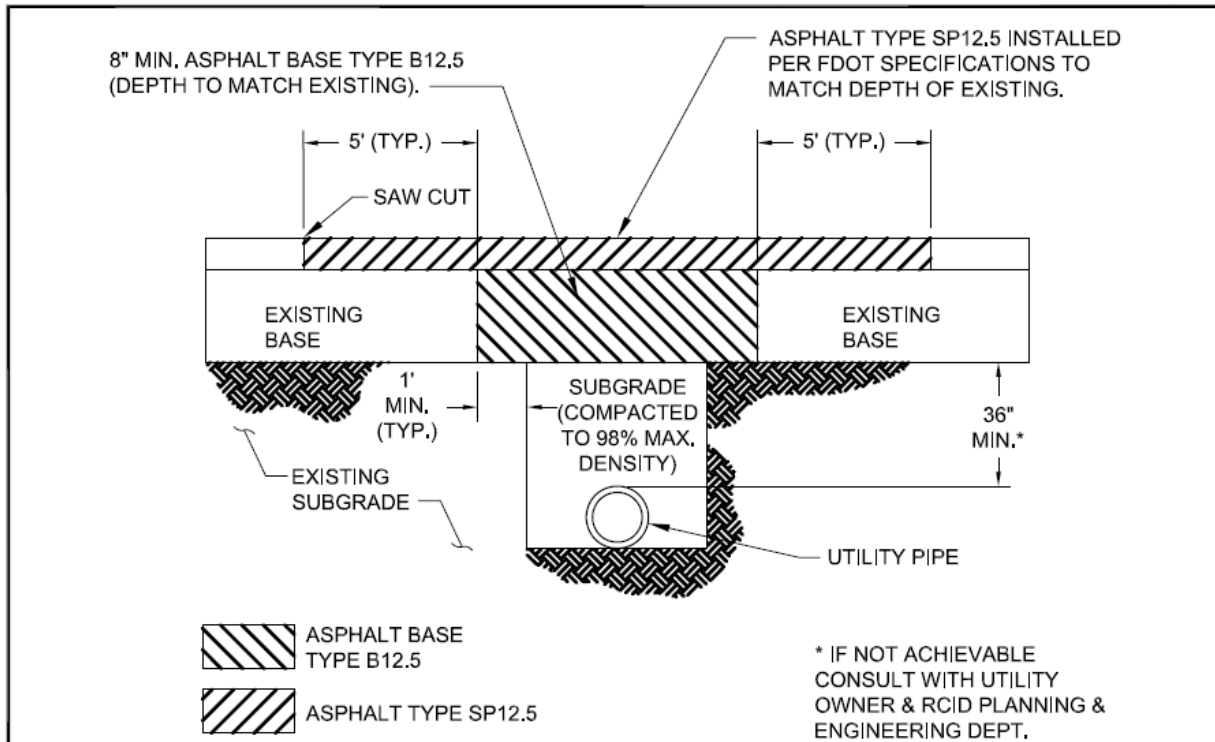
500 MAINS AND SERVICES – TRENCHING STANDARD

501 WIDTH

The road surface cut back and trench width for various size mains shall conform to the following table:

NOMINAL PIPE SIZE – INCHES								
	½ – ¾	1-1/4	2	3	4	6	8	12
PAVEMENT CUT BACK- BACK "A"	---	---	3	3	3	3	3	3
MINIMUM TRENCH WIDTH "W"	4	4	8	9	12	15	18	24
MAXIMUM TRENCH WITH "W"	12	12	15	15	15	18	24	30

See details 501, 502 and 503 for restoration details. Each of these details shall be followed for the applicable situation including ownership unless modified by specific contract document requirements. Detail 501 applies to RCID owned assets and Detail 502 and Detail 503 apply to WDW owned assets.



GENERAL NOTES:



1. BASE REPLACEMENT SHALL BE FDOT SECTION 234 TYPE B12.5 ASPHALT.
2. ASPHALT CONCRETE SURFACE MATERIAL SHALL BE REPLACED WITH FDOT SECTION 334 TYPE SP12.5 (TRAFFIC LEVEL B OR C).
3. MINIMUM ASPHALTIC CONCRETE SURFACE OVERLAY THICKNESS SHALL BE 1"-5" INCHES, OR AS APPROVED BY THE REEDY CREEK IMPROVEMENT DISTRICT, PLANNING AND ENGINEERING DEPARTMENT.
4. ALL JOINT CUTS SHALL BE MECHANICALLY SAW-CUT.
5. SUB-GRADE TO BE COMPACTED TO 98% MAX. DENSITY AS DETERMINED BY AASHTO T-180.
6. EXISTING SURFACE TO BE SAW CUT TO AN AREA 5 FEET BEYOND BASE CUT.

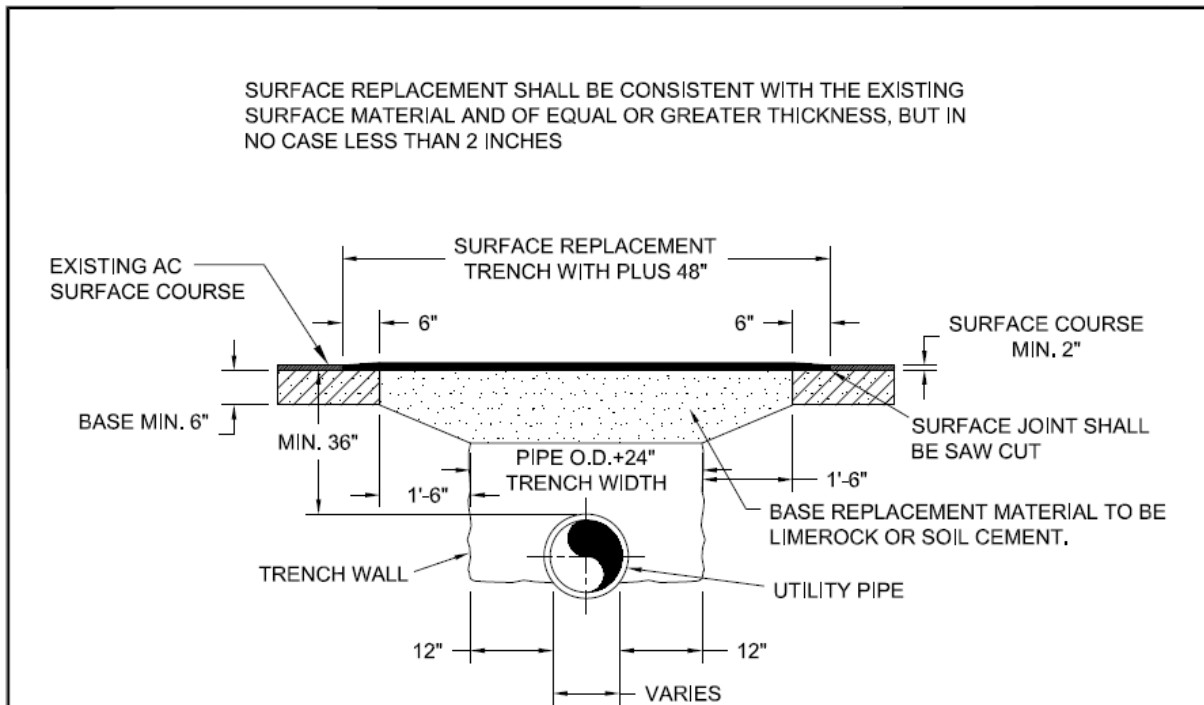
PAVEMENT RESTORATION:

1. LONGITUDINAL CUTS MAY REQUIRE MILLING AND OVERLAY/RESURFACING OF THE COMPLETE WIDTH OF THE TRAVELLED WAY.
2. REFER TO PLANS FOR LIMITS OF RESTORATION.
3. ALL NEW PAVEMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST FDOT SPECIFICATIONS.

PERMANENT ASPHALT PAVEMENT RESTORATION DETAIL



SCALE: N.T.S.

 Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	PERMANENT ASPHALT PAVEMENT RESTORATION				DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	3				FIGURE: 501
	2				
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GENERAL NOTES:

1. BACKFILL SHALL BE PLACED IN LAYERS NOT TO EXCEED 6 INCHES, FROM BENEATH THE HAUNCHES OF THE PIPE TO THE BASE AND SHALL BE COMPACTED TO NOT LESS THAN 98% RELATIVE DENSITY IN ACCORDANCE WITH AASHTO T-180.
2. BASE COURSE MATERIALS SHALL BE PLACED IN TWO OR THREE LIFTS AND SHALL BE COMPACTED BY TAMPING OR ROLLING TO THE ABOVE SPECIFIED DENSITY.
3. ROADWAY CUTS SHALL BE MADE BETWEEN THE HOURS OF 2 A.M. AND 6 A.M. TO MINIMIZE DISRUPTION OF TRAFFIC. ROADWAYS SHALL BE IN SAFE OPERATING CONDITION BY NOT LATER THAN 7 A.M. , THE CONTRACTOR SHALL PROVIDE SAFE, TEMPORARY DETOURS FOR TRAFFIC DURING OPEN CUT CONSTRUCTION.
4. COMPLY WITH FLORIDA TRENCH SAFETY ACT.

 ACES <small>REEDY CREEK ENERGY SERVICES</small> Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	WDW ROADWAY (ASPHALT PAVEMENT) OPEN CUT RESTORATION DETAIL	DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT																							
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502 DEPTH

A. Mains and Services

1. Mains and services in roadway including 1' back of curb or proposed curb:

The line shall be installed with a minimum cover of 36" to the nearest grade in all planes unless otherwise specified in the construction documents.

2. Mains and services installed in back of sidewalk or curb¹ or on an easement:

- a. Whenever lines are laid between the property line and the curb or on private property² in an easement, a minimum cover over the pipe of 36" shall be maintained unless otherwise specified in the construction documents. As the line approaches the roadway, strict care shall be exercised to keep the line at the minimum depth of 36" from top of pipe to established grade-

¹Crossing under the roadway or 1' of the curb or proposed curbs is not to be considered "back of sidewalk or curb."

²All buried pipelines and gas mains and services shall be installed with a minimum cover of 36" or more where external loads might result in pipe damage or where the area is subject to erosion.

3. Mains in solid rock:

Where rock is encountered, it shall be removed to a depth of at least one pipe diameter plus 9" and with enough depth to maintain 18" minimum cover over the line and the line installed in this trench. The bottom of the trench shall be lined with rock shield.

4. Cover of 36" not practical:

When this depth cannot be complied with and it is necessary to prevent damage from external loads or other hazard, the cover can be less than 36" provided the line is cased, bridged or otherwise protected as approved by the RCES Gas Engineer.

5. Marker tape is required on all pipelines. Marker tape shall be non-conductive and be installed 12" above the centerline of the pipe.

B. Trench Preparation

1. The trench bottom shall be considered rock-free is no stones greater than 1" in diameter are present.
2. The use of sand bags to facilitate the placing of the 3" bed of sand shall be permitted.

600 MAINS AND LATERALS – BACKFILL AND SURFACE RESTORATION

601 SCOPE

This Standard covers the requirements for backfilling, maintenance of backfilled trenches and holes, and the surface restoration of all excavations.

602 GENERAL REQUIREMENTS

- A. All backfilling shall comply with all applicable laws or regulations of the local governing authority and/or the RCES Gas Department.
- B. All walks, pavements, lawns, etc. shall be replaced in a manner satisfactory to the local governing authority or property owner and/or as directed by the RCES Inspector or the RCES Gas Engineer, whichever is most restrictive.
- C. All trenches shall be backfilled as soon as possible to prevent damage to the pipe or its coating, reduce safety hazards, and to minimize inconvenience to traffic, etc. Pipe installed in the trench shall not be left exposed overnight. It shall be backfilled to a minimum cover of 12”

603 SPECIFIC REQUIREMENTS

- A. Backfill Requirements
 - 1. Pipe Support
 - a. The gas piping shall be continuously supported along its entire length and undisturbed or well-compacted rock free soil, or a 3” bed of sand.
 - b. The use of sandbags to facilitate the placing of a 3” bed of sand shall be permitted.
 - 2. Bedding
 - a. Piping required bedding shall be bedded with sand compacted to a minimum of 3” and a maximum of 6” cover over the pipe.
 - b. Rock-free original spoil may be used in lieu of bedding sand. Spoil shall be considered rock-free if no stones greater than 1” in diameter are present.
 - 3. Backfill

- a. Original spoil shall be used for backfill. All stones larger than 3" in their greatest dimension, broken pavement, bricks, stick, welding rods and organic material shall discarded from the backfill and removed from the site. Spoil from excavations in ashes, cinders, peat, garbage dumps or other highly corrosive soils shall also be discarded and removed from the site.
- b. If bedding the piping is required, the remainder of the excavation shall be backfilled to the proper grade with original spoil.
- c. Tunnels shall be backfilled with original spoil or sand if specified in the construction drawings or required by either the RCES Inspector or the RCES Gas engineer. The backfill shall be thoroughly compacted.
- d. Where trenches are cut in steep slopes and are susceptible to washouts by rains, trench checks shall be installed by use of sandbags or other methods.
- e. Marker tape is required on all pipelines. Marker tape shall be non-conductive and installed 12" above the center line of the pipeline.

B. Compaction

All excavations in traveled roadways such as pavements, shoulder of roads, driveways, sidewalks, parking areas, etc. shall be compacted by one of the following methods. Compaction by power tamping shall be used when required by the contract documents and/or the RCES Gas Engineer, except when prohibited by a governing authority.

1. Compacting by Hand or with Equipment

The backfill material shall be free of broken concrete, asphalt, and other debris which might cause damage to the pipe and coating. Care shall be exercised to prevent cavities left while backfilling. Backfilling shall be done in lifts not greater than 8" and each lift shall be compacted with portable compactors.

2. Power Tamping

a. Bedding Sand and Backfill Soil

Power tamping of normal depth excavations shall be done in two or more lifts with an approved power-tamping device; the first, after the bedding sand has been covered by 8" of original spoil; the second and subsequent, in lifts not to exceed 8" (compacted) to within the specified distance from the paved surface as follows:

PAVEMENT TYPE	DEPTH FROM PAVED SURFACE
1. Macadam	6" to 8"
2. Concrete Base	
a. Asphalt	11"
b. Asphaltic Concrete	10"
3. Concrete	12"

b. Original Spoil

Power tamping of normal depth excavations shall be done with an approved power tamping device as follows: first, fill the excavation to pipe level and tamp the sides around the pipe; second and subsequent, in lifts not to exceed 8" (compacted) shall be tamped until the excavation has been completely filled.

C. Surface Cleanup

1. Excavated Material

- a. All broken pavement, rocks, and other miscellaneous rubble from removal of existing pavement shall be removed from the job site as construction progresses.
- b. When trenches and other excavation are to be backfilled with bedding sand and backfill soil, the original spoil shall be hauled away from the job site. When original spoils to be used as backfill all excess spoil shall be hauled away from the job site upon completion of the backfilling.

2. Other Material

Construction rubbish shall be allowed to build up during construction and shall be completely cleaned up immediately upon completion of the job and daily as work progresses.

3. Drainage

- a. Care shall be taken to prevent or limit the duration of obstruction to surface drainage during construction. Under no circumstances shall gutters or surface drain ways be blocked overnight unless temporary diversion channels are constructed.
- b. Catch basins shall be covered or otherwise protected against the inflow of spoil or turbid run-off.
- c. All regulations of the Federal EPA, Florida DER and the local Florida Water Management District shall be followed especially with respect to the control of turbid run-off, the collection and detention of surface flows from the construction site into surface waters and wetlands.

D. Surface Restoration

All surface restoration of the right-of-way and the surrounding area traveled shall be restored to its original or better than original condition as soon as possible after completion of construction, unless the contract documents specify different requirements. Contractor shall not destroy any bushes, trees or other primary landscaping items without first notifying the Owner and the RCES Inspector ten (10) working days in advance in order to permit relocation, if desired.

1. All curbs and gutters, pavements, public sidewalks and lawns located in the public right-of-way and/or damaged by construction shall be restored to the requirements of the governing authority or as directed by the contract documents, the RCES Inspector and/or the RCES Gas Engineer whichever is most restrictive.
2. All driveways, sidewalks and other paved areas which have been damaged on private right-of-way, shall be repaired with material similar in appearance and composition to the original condition unless the property owner of the improvements authorizes, in writing, the use of substitute materials.
3. When it is necessary to make temporary paving repairs, such repairs shall be sufficiently durable to last, without undue maintenance, until the permanent repair may be made. Such temporary repairs shall be frequently inspected and all holes and ruts smoothed over.

4. Damaged lawns shall be sodded or seeded as directed by the contract documents, RCES Inspector and/or the RCES Gas Engineer whichever is most restrictive.
5. Fences shall be restored in kind to their former strength and condition or better. Other types of enclosures, such as hedges, require special attention, but shall be replaced.

700 MAINS AND SERVICE LATERALS – CLEANING AND TESTING

701 SCOPE

All mains, service laterals and appurtenances shall be leak tested for proof of strength as prescribed in this Standard and each leak has been located and eliminated.

702 TESTS

- A. Prior to placing any new main or service line (new or reactivated), into operation, it shall be pressure tested to assure that there are no leaks and that it will safely withstand a pressure of up to 1.5 times the MAOP. The only exception is noted in Section 702.B.

The minimum test pressure shall be 90 psig regardless of whether or not the estimated maximum operating pressure would permit a lower test pressure. Wherever possible, main and service lines shall be tested simultaneous as a unit. Where feasible, the service line connection to the main should be tested with the service line.

1. All medium pressure gas mains and service laterals shall be designed and tested for 60 psig MAOP.
 - a. All MPG mains and service laterals shall be tested at 150 psig unless the contract documents and/or the RCES Gas Engineer indicate otherwise.
 2. All high pressure gas mains and service laterals shall be designed and tested for 150 psig MAOP.
 - a. All HPG mains and service laterals shall be tested at 225 psig unless the contract documents and/or the RCES Gas Engineer indicate otherwise.
- B. Where a component other than pipe is the only items being replaced or added to the main, no further test is required if:
1. The manufacturer of the component certifies that it was tested to at least 175 psig; or
 2. That the component was manufactured under a quality control system that assures that each item manufactured is at least equal in strength to a prototype and that prototype was tested to at least 175 psig.
 3. For fabricated units and short sections of pipe for which a post-installation test is impractical, a pre-installation test shall be conducted by maintaining the test pressure required for the main to which it is being added for at least four (4) hours. The connecting points shall then be soap-tested with full line pressure on the new addition.

4. All mechanical joints and valves shall be soap-tested during a main or service lateral pressure test to check for leaks if air or inert gas is being used as the test medium. If water is used as the test medium, the joints and valves shall be visually inspected for leaks during the pressure test.
5. When testing against a closed valve on an operational line, a “flange pancake” of 1/8” thick stainless steel shall be installed on the test side of the valve.
6. The test duration for mains and service laterals shall be as shown in the following table:

PRESSURE TEST – MINIMUM TEST DURATION FOR GAS MAINS AND SERVICE LINES

Feet of Line	Diameter of Pipe in Inches										
	½ – 1	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10	12
	Time in Hours										
100	1/12 ¹	1/6 ¹	1/4 ¹	1/4 ¹	1/2 ¹	1/2 ¹	1	2	4	5	8
200	1/6 ¹	1/6 ¹	1/4 ¹	1/2 ¹	3/4 ¹	1	2	4	6	10	14
300	1/4 ¹	1/4 ¹	1/2 ¹	3/4 ¹	1	2	2	5	9	14	20
400	1/2 ¹	1/2 ¹	1/2 ¹	3/4 ¹	2	2	3	7	12	19	27
500	1/2 ¹	1/2 ¹	3/4 ¹	1	2	2	4	9	15	24	34
600	1/2 ¹	1/2 ¹	3/4 ¹	1-1/4	2	3	4	10	18	28	41
700	1/2 ¹	1/2 ¹	3/4 ¹	1-1/2	3	3	5	12	21	33	47
800	1/2 ¹	1/2 ¹	3/4 ¹	1-1/2	3	4	6	14	24	38	54
900	3/4 ¹	3/4 ¹	3/4 ¹	1-3/4	3	4	6	15	27	42	61
1000	3/4 ¹	3/4 ¹	1-1/4	2	4	5	8	17	31	47	70

¹Note: Minimum test durations for mains shall be one (1) hour.

For lengths of pipe over 1000 feet, use multiples of the above figures. The test period will begin after the pressure has stabilized due to temperature changes. It should be noted that the test sections should normally be of 1000 foot intervals or less to enable the contractor to locate leaks faster and to keep test durations to a minimum.

703 TEST MEDIUM

The test medium allowable for the various pipe sizes and pressure systems shall be air or inert gas unless otherwise specified by the contract documents. If water is requested as the test medium, prior authorization shall be obtained from the RCES Gas Engineer.

704 SAFETY

All testing shall be done with due regard for the safety of employees and the public during the test. Where air is used while testing at pressures in excess of that required, people

not connected with the testing shall be kept from the testing area until the pressure has been reduced to the maximum operating pressure or lower.

705 PIGGING

All mains 2-1/2" and larger shall be pigged with a cup and brush pig to remove all mill scale, rust, and other debris which may be in the pipe. Where water is used as a test medium, it is required that the main be pigged with a foam urethane pig to remove all water when the test is completed. Pig selection should be made such that the pig will pass through all pipeline valves and fittings. Dust socks shall be used for all pigging operations unless prior approval to eliminate this requirement has been obtained from the RCES Gas Engineer.

706 INERT GAS

- A. Nitrogen or gaseous carbon dioxide (CO₂) may be substituted for air when contract documents permit and with the approval of the RCES Gas Engineer. The term "gas" as used herein shall be construed to mean natural gas or a liquid petroleum gas vapor if distributed through a piping system to the user.
- B. Nitrogen or gaseous carbon dioxide must be used instead of air or water when testing piping separated from live gas by a closed valve stopper device or flange pancake.
- C. When testing with nitrogen extreme caution shall be exercised in its containment due to its tendency to asphyxiate in close or confined spaces. This hazard is present in any area with limited ventilation. Blowers and/or air movers shall be used to ventilate these locations; these locations shall also be continuously monitored for air quality including oxygen levels.

707 TEST RECORDS

A record shall be made of all strength or leak tests required in Subpart of Part 192 MFSS, and shall include the location of the pipeline, length, diameter, type of facility, pressure sustained, duration and date of test, signature of employee responsible for test, test medium, leaks found, corrections made, and test charts of pressure recordings.

708 CLEANING

Upon completion of a test, or a re-test if required, the mains and services shall be thoroughly cleaned and purged prior to placing them in service. Mains sized 2" and under shall be cleaned by blowing them out with air and/or inert gas. Adequate volume and velocity of the air must be provided to assure that the lines are clean. Mains 2-1/2" and larger OD shall be pigged until objectionable quantities of foreign matter are removed. If there is any doubt as to cleanliness, a white sheet shall be fastened to the pig target to clearly show the amounts of contaminants leaving the pipe with the pig.

709 TIE-IN WELDS

Tie-in welds do not have to be pressure tested, but each weld must be soap-tested and visually checked for leaks after the system is pressurized. Additionally, the RCES Gas Department may choose to use electronic gas detectors to inspect any tie-in. The results of this test will be conclusive, even if negative results were obtained with the soap-test.

710 PURGING

- A. When purging the distribution system of air or gas, the purging medium shall be released into the system at a sufficient pressure and continuous flow rate to prevent the formation of an explosive mixture within the piping system. This operation shall be continued until the piping system is completely purged.
- B. If, in the opinion of the RCES Gas Utility Services Manager, the RCES Gas Engineer, or the RCES Inspector, formation of an explosive mixture within the piping system is possible, purging shall be accomplished in accordance with the following procedure:
 1. A quantity of inert gas shall be injected into the system between the air or gas and the purging medium. Separation pigs will be inserted at the upstream and downstream inert gas interfaces so that a positive seal is formed between the pig and internal periphery of the pipe. The quantity of inert gas required shall be determined by the RCES Gas Engineer.

711 ISOLATION

If new mains that will not be commissioned into service but which are otherwise complete are required to be connected to an existing system that is in service, shall be connected to the valve at the active main but separated by a "flange pancake" on the inactive steel, smooth faced, and equipped with an 8" handle. The newly completed but uncommissioned main shall be left pressurized with a minimum of 20 psig but not more than 40 psig of dry nitrogen.

712 SPECIAL TESTS

Sections of pipeline installed under major crossings in casing or in bored and jacked openings, which would be difficult or expensive to repair after completion of the line, will be tested before they are tied in. Such sections shall be plugged and tested at a pressure at which the balance of the line will be tested. These sections will be installed prior to final testing of the entire main and thus will be re-tested after tie-in with the completed construction.

800 SERVICE LATERAL – NEW CONSTRUCTION

801 SCOPE

This section covers the construction of new service laterals and includes specifications for; planning the construction, fabrication and assembly, installation and pressure testing. Refer to Standard 300 for Design and Installation – New Construction for additional requirements.

802 MINIMUM SIZES OF SERVICE LATERALS

The minimum sizes of new service laterals shall be $\frac{3}{4}$ " NPS unless approved by the RCES Gas Engineer.

803 MATERIAL

The material requirements for all service laterals shall be in accordance with Standard 200 and Standard 300.

804 LINE OF SERVICE LATERAL

The service lateral shall be installed in a straight line and at right angles to the property line whenever possible.

805 SERVICE ENTRANCE INTO BUILDING

- A. The standard shall be an above-ground riser with the meter and regulator installed outside with sufficient space for maintenance and meter reading.
- B. The meter/regulator location shall be such that it is protected from traffic hazards and located in relation to building vents and air intakes such that gas vented from a regulator will not be drawn into the building.
- C. No service lateral shall be installed under a building.
- D. All gas meters, regulators, piping, valves and any item which could possibly leak gas must be a minimum of 10 feet from any equipment with the potential to produce a spark unless approved by the RCES Gas Engineer.
- E. All penetrations through pavement, concrete slabs, walls, etc. shall have a schedule 40 steel sleeve with a minimum $\frac{1}{2}$ " clearance between the gas piping and sleeve. The interstitial space between the gas piping and sleeve shall be caulked as specified or as directed by the Owner's Representative.

806 OUTSIDE SERVICE STOPS

All service laterals shall be provided with a stop external to the building. An underground valve shall be installed at the property line where possible, otherwise at a location accessible for emergency operation. All service riser valves shall be equipped with an integral lock-wing or separable manufacturer's standard locking device.

807 GENERAL SPECIFICATIONS

A. Material Handling:

1. No pipe shall be dropped, dragged, rolled or otherwise roughly handled.
2. Coated steel pipe – Care shall be exercised to prevent damage to the pipe coating. Padded slings, calipers or special end hooks shall be used when handling mill-coated pipe. Padded timbers or sand bags shall be provided for stringing, stockpiling or transporting pipe lengths.

B. Excavations

1. Trenches, tie-in holes, bleeder-end holes, auger bores and pushed bores, shall be excavated in accordance with Standard 500. Services of 3/8" O.D. through 3" NPS steel pipe may be installed by use of an approved plow device where soil is such that the steel pipe coating would not be damaged during construction.
2. Service piping shall be laid to a minimum of 36" from the top of pipe to established grade at the centerline of pipe. Pipe may be laid with as little as 24" cover provided and the RCES Gas Engineer concurs that the conditions warrant the deviation from the Standard. No service may be installed with less than 24" of cover without a protective concrete cap and the prior approval from the RCES Gas Engineer.
3. The bottom of the trench shall be graded so that the entire service lateral is bedded on undisturbed or compacted soil.
4. Pipe shall not be laid in trenches with sewer, water, telephone, electrical conduit or cable or similar structures. Where practical, a horizontal distance of five (5) feet from other structures shall be maintained. A distance of 12" minimum shall be maintained at all times from all other underground structures and utilities. If the 12" minimum cannot be maintained, specific protection shall be provided in the form of dielectric barriers and blocks to protect the service but only with the prior approval from the RCES Gas Engineer.
5. Pipe can be installed under walks and driveways in tunneled, augured, or bored openings. When coated steel pipe is installed by boring or driving, the coated pipe shall not be used as the bore pipe or drive pipe and left as part of the service lateral. Exceptions to this Standard may be made for fusion-bonded epoxy coated pipe with prior approval from the RCES Gas Engineer.

6. All mill coated pipe and all field joint wrappings shall be closely inspected for coating faults prior to lowering into the trench. Coating faults in thick film coatings shall be performed using a high voltage holiday detector that develops between 7,500 and 12,000 volts. Thin film coatings shall be holiday tested using a low voltage holiday tester developing between 1000 and 2000 volts (100 volts per mil). If instructed by the construction documents, the installing contractor shall supply the appropriate holiday detector and comply with the following; voltage output shall be bench-tested at least once per quarter or twice during a project's construction, which every is more frequent; the detector shall be equipped with the appropriate brushes and attachments so that the entire pipe surface can be tested; all holidays shall be repaired and tested.
7. At the request of the RCES Gas Engineer, the gas piping shall be tested for coating defects with a fault locator. It shall also be tested for electrical contacts utilizing the various electrical instruments designed for this purpose. For these tests, the gas line shall have been backfilled to a minimum cover of 12". Any coating defects or electrical contacts shall be uncovered and immediately repaired or eliminated.
8. Marker tape is required on all pipelines. Marker tape shall be non-conductive and installed 12" above the centerline of the pipeline.

C. Method of Joining

All welding of steel pipe shall be done in accordance with the welding procedures in this Standard by a qualified welder.

D. Coating Requirements

All steel piping, valves, valve appurtenances and other steel fittings installed underground shall be coated in accordance with the coating requirements in Standard 1000.

E. Installation of Service

1. Pipe to be pushed or pulled through auger holes, casings or bores shall be full length and have as patch free a coating as possible. Bull head plugs designed to seal pipe against entry of foreign material when the service lateral is inserted shall be used. When pipe is installed in casing, spacers shall be located on the pipe to prevent contact with the casing and the ends shall be sealed to prevent entry of foreign material. The casing shall also be vented.
2. The bottom of the trench shall be cleared of all rocks, rubble, brush, welding rods and other debris before installing pipe.
3. 12" inch vertical clearance between service lateral and other facilities and structures crossed shall be maintained, wherever possible. Minimum clearance of five (5) feet shall be maintained between service lateral and parallel electrical

cables of 4160 volts and higher. Minimum parallel clearance to 480 volt cables shall be two (2) feet. Special precautions shall be taken to avoid crushing or electrical interference with other structures if the specified clearances cannot be maintained.

4. Changes in direction shall be made as follows:

Steel pipe – Cold bends or weld fittings shall be used. Bends shall conform to the following:

Size NPS	Minimum Radius	Maximum Diameter Difference
1/2" – 3/4"	6-3/4"	12%
1"-1-1/4"	7-1/4"	12%
2"	9-1/2"	12%

The longitudinal weld of the pipe shall be within 45 degrees of the neutral axis of the bend.

5. All test wires, controls points and other corrosion facilities shall be installed in accordance with these Standards.
6. A valve box shall be installed over a valve. The box shall be traffic bearing type with a non-metallic – screw type adjustable section. A concrete paving ring shall be installed with each valve box. The valve box shall be blocked so that it does not bear on the service pipe. The box shall be perpendicular and centered over the valve to facilitate operating the valve with a key from above ground. The box shall not electrically short the pipe. Boxes shall be supported in their own concrete ring to prevent settling. See Details 301 and 302 in Section 300.
7. All service laterals installed without a meter or regulator assembly shall have the service riser stop plugged or blind flanged and a locking device installed on the stop. A locking device will also be employed to prevent the unauthorized operation of the stop when the service lateral is installed with a connected meter or regulator not in use.
8. Cathodic Protection – All steel service lateral or isolated portions thereof shall be cathodically protected in accordance with these Standards.

808 BACKFILLING

Trenches and other excavations shall be backfilled and the surface restored in accordance with Standard 600.

809 TESTING

All new service laterals shall be tested for leaks prior to the admission of gas in accordance with the test prescribed in Standard 700.

810 PROTECTING AGAINST PIPING STRAIN AND EXTERNAL LOADING

Each service lateral must be installed so as to minimize anticipated piping strain and external loading.

811 INSTALLATION OF SERVICE LINES UNDER BUILDINGS

The installation of service laterals under buildings shall be avoided whenever possible. Service laterals shall not be installed under buildings without the prior written approval of the RCES Gas Engineer and the Design Engineer. If a service lateral must be installed under a building the following precautions, at a minimum, must be taken:

- A. It must be encased in a gas-tight conduit.
- B. The conduit and the service lateral must, if the service lateral supplied the building it underlies, extend into a normally usable and accessible part of the building.
- C. The interstitial space between the conduit and the service line must be sealed to prevent gas leakage into the building and, if the conduit is sealed at both ends, a vent line from the annular space must extend to a point where gas would not be a hazard, extend above grade, terminate in a rain and insect resistance fitting and be painted "Safety Yellow."

812 SERVICE LATERAL VALVE LOCATION

- A. Relation to regulator or meter: Each service lateral valve must be installed upstream of the regulator or, if there is no regulator, upstream of the meter.
- B. Outside valves: Each service lateral must have a shut-off valve in a readily accessible location that is outside the building.

813 CONNECTIONS TO MAINS

- A. Each service lateral connection to a main should be located at the top or side of the main, with preference given to the top.
- B. In the circumstances where a service lateral connection to main is not possible to be made that the top or side of the main, prior authorization from the RCES Gas Engineer is required.
- C. Compression type connections shall not be used.

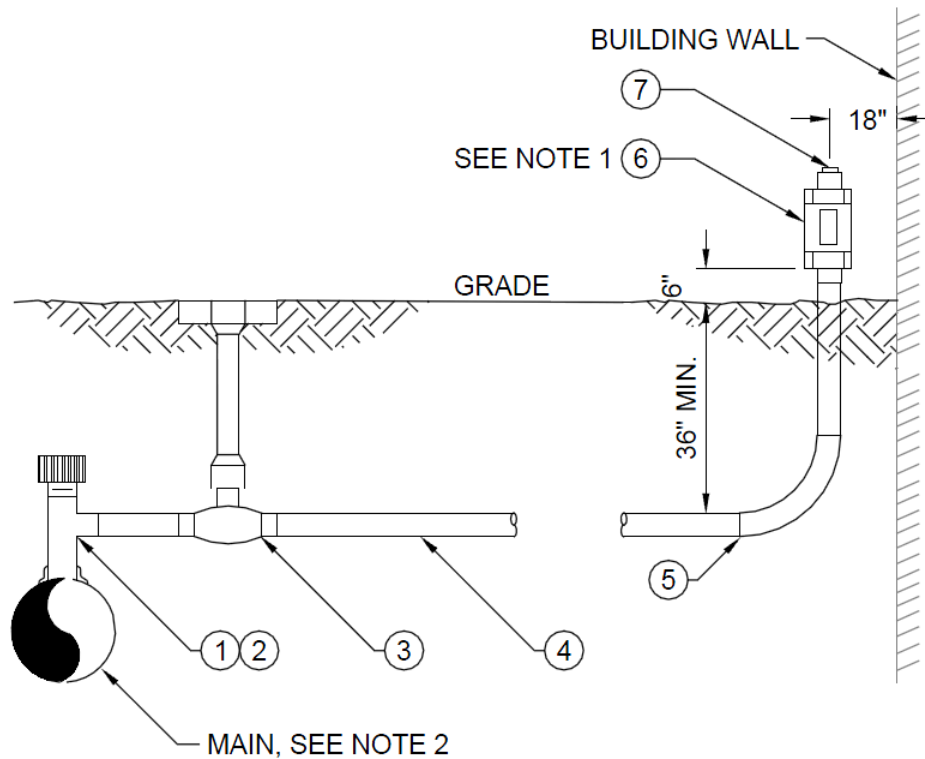
900 SERVICE LATERAL – DETAILS

901 SERVICE RISER – NEW CONSTRUCTION – 1/2” AND 3/4” NPS STEEL

- A. Service tee may be tipped to a maximum of 90 degrees and the service pipe bent to aid in alignment or to maintain minimum cover.
- B. All bends to have a 6-3/4” minimum radius and a maximum diameter difference of 12%.
- C. Apply 3M 323 two-part epoxy coating or approved equal to the exposed portions below grade and to any damaged area and repair as necessary.
- D. See Detail 901 for additional requirements.

902 SERVICE RISER – NEW CONSTRUCTION – 1”- 2” NPS STEEL



- A. Service tee may be tipped to a maximum of 90 degrees and the service pipe bent or weld ells installed to aid in alignment or to maintain minimum cover.
- B. Apply 3M 323 two-part epoxy coating or approved equal to the exposed portions below grade and to any damaged area and repair as necessary.
- C. See Detail 902 for additional requirements.



KEY	DESCRIPTION
1	MUELLER H18102 AUTOPERF TEE OR H17650 NO-BLO TEE OR APPROVED EQUAL
2	DRILL HOLE IN MAIN THROUGH TEE
3	KEROTEST WELDBALL VALVE (WELD x WELD) WITH VALVE BOX OR APPROVED EQUAL
4	PIPE, COATED STEEL API5L OR APPROVED EQUAL
5	LR 90° ELL, STEEL
6	MUELLER H11175G GAS METER VALVE RATED FOR 175 PSIG W/ INTEGRAL LOCKING DEVICE OR APPROVED EQUAL
7	3000# SOLID STEEL PLUG, THREADED

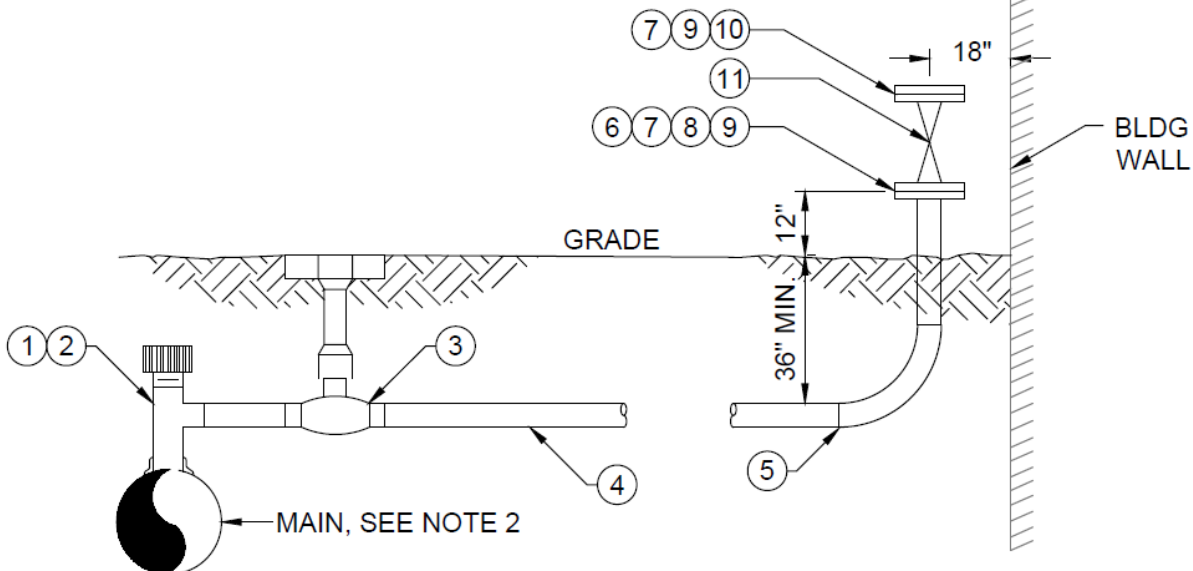
NOTES:

1. STOP STEM SHALL PARALLEL WALL WITH LOCK-WING ON SIDE OPPOSITE METER INSTALLATION.
2. BLOCKING UNDER MAIN AT SERVICE MAY BE REQUIRED WHEN EXCAVATION EXTENDS BENEATH MAIN.

 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	ABOVE GROUND SERVICE RISER 1" - 2" SERVICES		DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT															
	<table border="1"> <tr> <td>6</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>BLT</td> <td>6/1/2016</td> <td>GAS MANUAL UPDATE</td> </tr> <tr> <td>ISSUE</td> <td>APPR</td> <td>DATE</td> <td>ISSUED FOR</td> </tr> </table>		6				5				4	BLT	6/1/2016	GAS MANUAL UPDATE	ISSUE	APPR	DATE	ISSUED FOR
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ISSUE	APPR	DATE	ISSUED FOR															

903 SERVICE RISER – NEW CONSTRUCTION – 2-1/2” THROUGH 12” NPS STEEL



- A. Tee may be tipped to a maximum of 90 degrees and the service pipe bent or weld ells installed to aid in alignment or to maintain minimum cover.
- B. Apply 3M 323 two-part epoxy coating or approved equal to the exposed portions below grade and to any damaged area and repair as necessary.
- C. See Detail 903 for additional requirements.



KEY	DESCRIPTION
1	MUELLER H17503, MUELLER NO BLO LINE STOPPER, HOT TAP OR APPROVED EQUAL
2	DRILL HOLE IN MAIN THROUGH TEE
3	KEROTEST WELDBALL VALVE (WELD x WELD) WITH VALVE BOX, OR APPROVED EQUAL
4	PIPE, COATED STEEL API5L OR APPROVED EQUAL
5	LR 90° ELL, STEEL
6	FLANGE, SLIP-ON OR WELD NECK STEEL, ANSI B16.5 CLASS 150, RF
7	STUD BOLTS
8	GASKET, INSULATED, BOLT SLEEVES OR WELD-IN FIBERGLASS INSULATOR
9	GASKET, FLAT RING
10	FLANGE, BLIND, STEEL, ANSI B16.5 CLASS 150 RF
11	VALVE - FLANGED, ROUND PORT LUBRICATED PLUG C.I. BODY RATED FOR 175 PSIG MIN WOG DEVICE

NOTES:

1. STOP STEM SHALL PARALLEL WALL WITH LOCK-WING ON SIDE OPPOSITE METER INSTALLATION.
2. BLOCKING UNDER MAIN AT SERVICE MAY BE REQUIRED WHEN EXCAVATION EXTENDS BENEATH MAIN.
3. SERVICE TEES MAY BE USED ONLY WHEN THE SERVICE LATERAL IS TWO OR MORE STANDARD PIPE SIZES SMALLER THAN THE MAIN. WHEN THE SERVICE LATERAL IS ONE SIZE SMALLER OR EQUAL TO THE MAIN, THE LATERAL CONNECTION SHALL BE MADE USING A FACTORY BUTT-WELD OR A SPLIT SLEEVE FITTING.

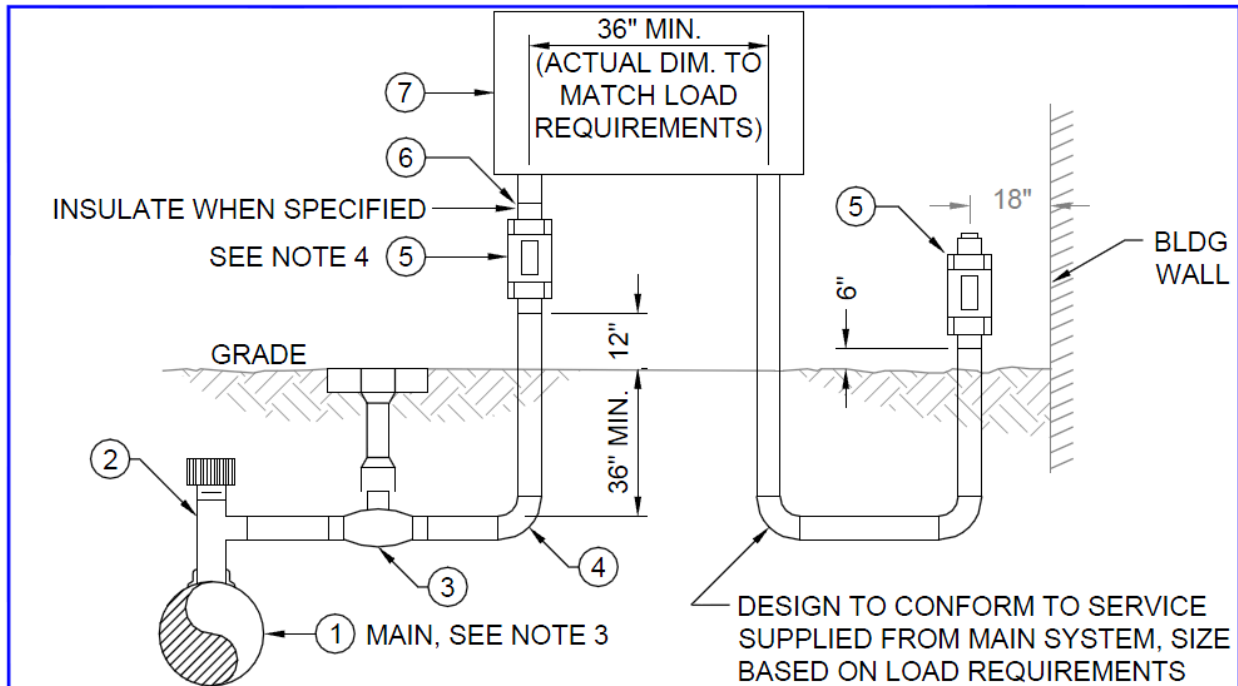
 Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	ABOVE GROUND SERVICE RISER 2 1/2" THRU 12" SERVICES			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
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904 SERVICE LATERAL – NEW CONSTRUCTION – ½” THROUGH 2” NPS STEEL

- A. Apply 3M 323 two-part epoxy coating or approved equal to the exposed portions below grade and to any damaged area and repair as necessary.
- B. See Detail 904 for additional requirements.

905 SERVICE LATERAL – NEW CONSTRUCTION – 2-½” THROUGH 12” NPS STEEL



- A. Apply 3M 323 two-part epoxy coating or approved equal to the exposed portions below grade and to any damaged area and repair as necessary.
- B. See Detail 905 for additional requirements.

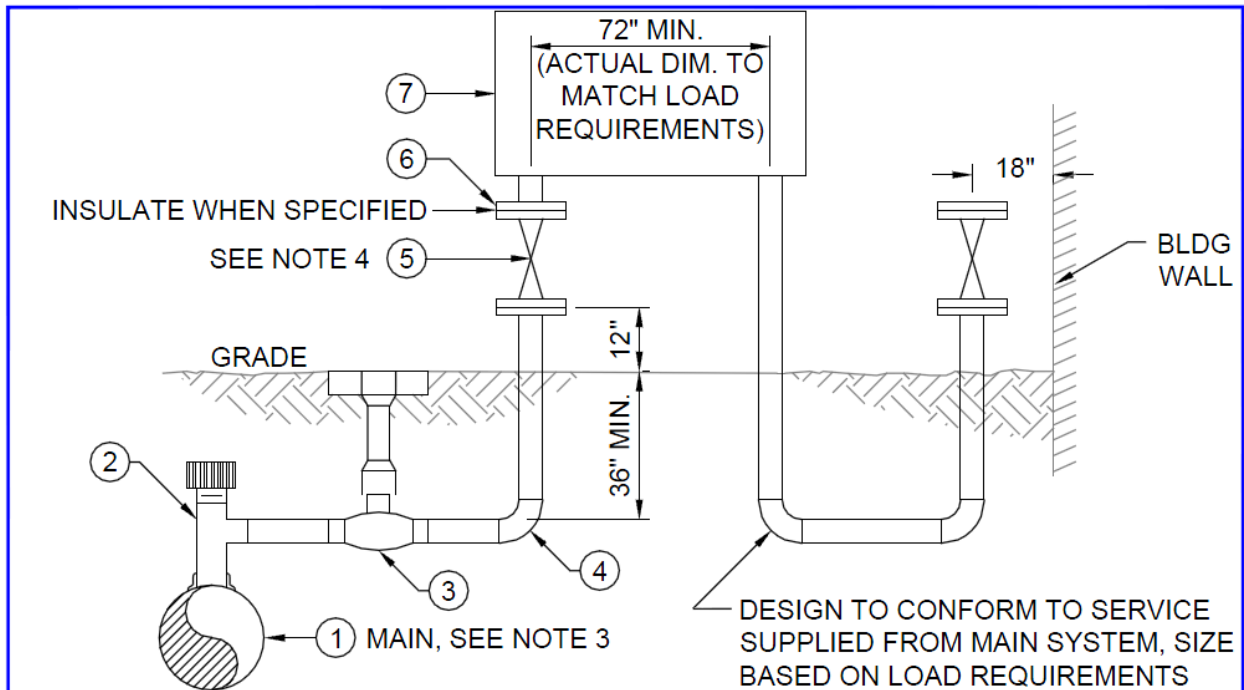


KEY	DESCRIPTION
1	PIPE, COATED STEEL, AP15L OR APPROVED EQUAL
2	TEE, SERVICE STEEL, MUELLER H17503, H18102 OR APPROVED EQUAL
3	KEROTEST WELDBALL VALVE (WELD x WELD) WITH VALVE BOX, OR APPROVED EQUAL
4	ELL, 90, STD. STEEL, WELD LR (1/2" NPS TO 2" NPS)
5	STOP, MUELLER H11175G, CENTURION II OR APPROVED EQUAL. VALVE SHALL BE EQUIPPED WITH INSULATOR AND INTEGRAL LOCKING DEVICE
6	NIPPLE, STEEL, GRADE B, TOE (1/2" NPS TO 2" NPS)
7	REGULATOR, MASTER METER (COMPLETE ASSEMBLY)

NOTES:

1. TEE MAY BE ROTATED TO A MAXIMUM OF 90° AND SERVICE PIPE BENT OR WELD ELLS INSTALLED TO AID IN ALIGNMENT OR TO MAINTAIN MINIMUM COVER.
2. ALL BENDS SHALL HAVE A MINIMUM RADIUS OF 6 3/4" AND A MAXIMUM DIAMETER DIFFERENCE OF 12 PERCENT (1/2" AND 3/4").
3. BLOCKING UNDER MAIN AT SERVICE TEES MAY BE REQUIRED WHEN EXCAVATION EXTENDS BENEATH MAIN.
4. STOP STEM SHALL BE PARALLEL TO WALL WITH LOCK-WING ON SIDE OPPOSITE METER INSTALLATION.
5. SERVICE TEES MAY BE USED ONLY WHEN SERVICE LATERAL IS TWO (2) OR MORE STANDARD PIPE SIZES SMALLER THAN THE MAIN. WHEN THE SERVICE LATERAL IS ONE (1) SIZE SMALLER OR EQUAL TO THE MAIN, THE LATERAL CONNECTION SHALL BE MADE USING A FACTORY BUTT WELD OR SOCKET WELD TEE OR A SPLIT-SLEEVE FITTING.
6. WRAP UNCOATED PORTIONS OF PIPE WITH TAPE & PRIMER, MASTIC & GLASS OR COATING SYSTEM AS REQUIRED IN THE "STANDARDS".



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KEY	DESCRIPTION
1	PIPE, COATED STEEL, AP15L OR APPROVED EQUAL
2	TEE, SERVICE STEEL, MUELLER H17503, H18102, MUELLER LINE STOPPER FITTING OR APPROVED EQUAL
3	KEROTEST WELDBALL VALVE (WELD x WELD) WITH VALVE BOX, OR APPROVED EQUAL
4	ELL, 90, STD. STEEL, WELD LR (2 1/2" NPS TO 12" NPS)
5	VALVE, LUBRICATED PLUG, C.I., FLANGES PER ANSI B16.5 WITH INTEGRAL LOCKING DEVICE
6	FLANGE, BLIND, STEEL, ANSI B16.5 CLASS 150 RF
7	REGULATOR, MASTER METER (COMPLETE ASSEMBLY)

NOTES:

1. TEE MAY BE ROTATED TO A MAXIMUM OF 90° AND SERVICE PIPE BENT OR WELD ELLS INSTALLED TO AID IN ALIGNMENT OR TO MAINTAIN MINIMUM COVER.
2. ALL BENDS SHALL HAVE A MINIMUM RADIUS OF 6 3/4" AND A MAXIMUM DIAMETER DIFFERENCE OF 12 PERCENT (1/2" AND 3/4").
3. BLOCKING UNDER MAIN AT SERVICE TEES MAY BE REQUIRED WHEN EXCAVATION EXTENDS BENEATH MAIN.
4. VALVE STEM SHALL BE PARALLEL TO WALL WITH SQUARE HEAD ON SIDE OPPOSITE METER INSTALLATION.
5. SERVICE TEES MAY BE USED ONLY WHEN SERVICE LATERAL IS TWO (2) OR MORE STANDARD PIPE SIZES SMALLER THAN THE MAIN. WHEN THE SERVICE LATERAL IS ONE (1) SIZE SMALLER OR EQUAL TO THE MAIN, THE LATERAL CONNECTION SHALL BE MADE USING A FACTORY BUTT WELD OR SOCKET WELD TEE.
6. WRAP UNCOATED PORTIONS OF PIPE WITH TAPE & PRIMER, MASTIC & GLASS OR COATING SYSTEM AS REQUIRED IN THE "STANDARDS".

 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	SERVICE LATERAL NEW CONSTRUCTION 2 1/2" THRU 12" NPS STEEL		DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT															
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1000 CORROSION CONTROL OF STEEL PIPING

1001 SCOPE

This Standard covers the methods of protection used to safeguard the underground steel gas distribution mains and laterals from corrosion in conformance with the requirements of Subpart I to Part 192 in Title 49, Code of Federal Regulations.

1002 GENERAL REQUIREMENTS

- A. New Construction – Protection shall consist of the following:
 - 1. Coating with a protective material
 - 2. Electrical bonding or insulation by sections.
 - 3. Electrical insulation from dissimilar metals and foreign structures.
 - 4. Application of cathodic protection.
- B. Existing Facilities – Protection shall consist of the following:
 - 1. Electrical bonding or insulation by sections.
 - 2. Electrical insulation from dissimilar metals from foreign structures.
 - 3. Application of cathodic protection.

1003 COATINGS

All new and replacement steel pipe, valves, and fittings for underground installation shall be coated with a protective material conforming to the requirements of Standard 1400.

1004 ELECTRICAL ISOLATION

To simplify the locating of shorts and other defects in a system under protection, insulating fittings shall be installed to divide the underground piping system into smaller electrically isolated areas.

1005 CATHODIC PROTECTION

- A. Magnesium Anodes:
 - 1. Anodes shall be installed a minimum of two feet from foreign metallic structures.

2. Anodes shall be installed on new coated steel service laterals connected to coated steel mains when specified by the Corrosion Design Engineer and approved by the RCES Gas Engineer. For connections to bare steel, size anodes in accordance with Table 1001.
3. Anode excavations shall be backfilled with the original spoil from which all stones and rocks have been removed. The backfill shall be tamped and flushed with water.
4. The anode lead wire shall be attached to the main or service lateral as specified in this Standard.

B. Anode Sizing:

1. Anodes for installation on partial services lateral renewals and on new coated steel service laterals on bare steel mains shall be sized in accordance with Table 1001.

Table 1001

SIZE OF PIPE (NPS)	LENGTH OF 3# ANODE (feet)	SERVICE PROTECTED ¹ 17# ANODE
1/2" OR 3/4"	0 TO 300	301 TO 2000
1"	0 TO 300	301 TO 2000
1-1/4"	0 TO 300	301 TO 2000
2"	0 TO 200	201 TO 1500
3"	0 TO 150	151 TO 1000
4"	0 TO 150	151 TO 800
5"	0 TO 50	51 TO 175
6"	0 TO 40	41 TO 150
12"	0 TO 25	26 TO 100

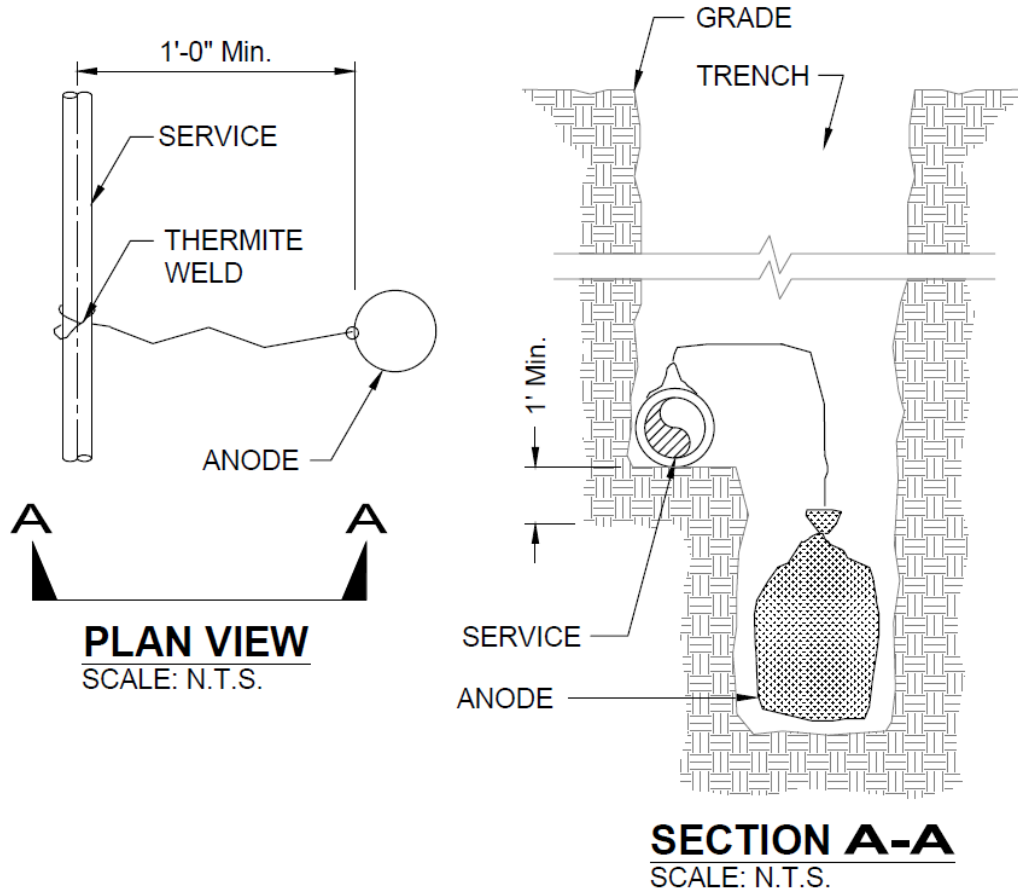
¹Based upon a 20 year design life.

2. Anodes for installation on new coated steel mains shall be sided by the Corrosion Design Engineer with the concurrence of the RCES Gas Engineer. When new coated services are connected to old coated steel mains that are not protected by an impressed current rectifier system, a 17 pound anode shall be attached at each such connection.
3. For items not covered in the above paragraphs, the requirements shall be as specified by the Corrosion Design Engineer with the concurrence of the RCES Gas Engineer.

C. Anode Installation (Service Lateral Without Test Station)

1. See Detail 1001.

-
2. Anodes shall be installed as shown when partial service lateral renewals are made.



NOTE:

1. ANODES ARE 17 POUND PRE-PACKAGED MAGNESIUM WITH MINIMUM 10' INTEGRAL CABLE, #8 OR #10 STRANDED WITH HWMPE JACKET BY NORTON, BAC OR APPROVED EQUAL



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**ANODE INSTALLATION
 SERVICE LATERAL
 WITHOUT TEST STATION**

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DESIGNED FOR:



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FIGURE:

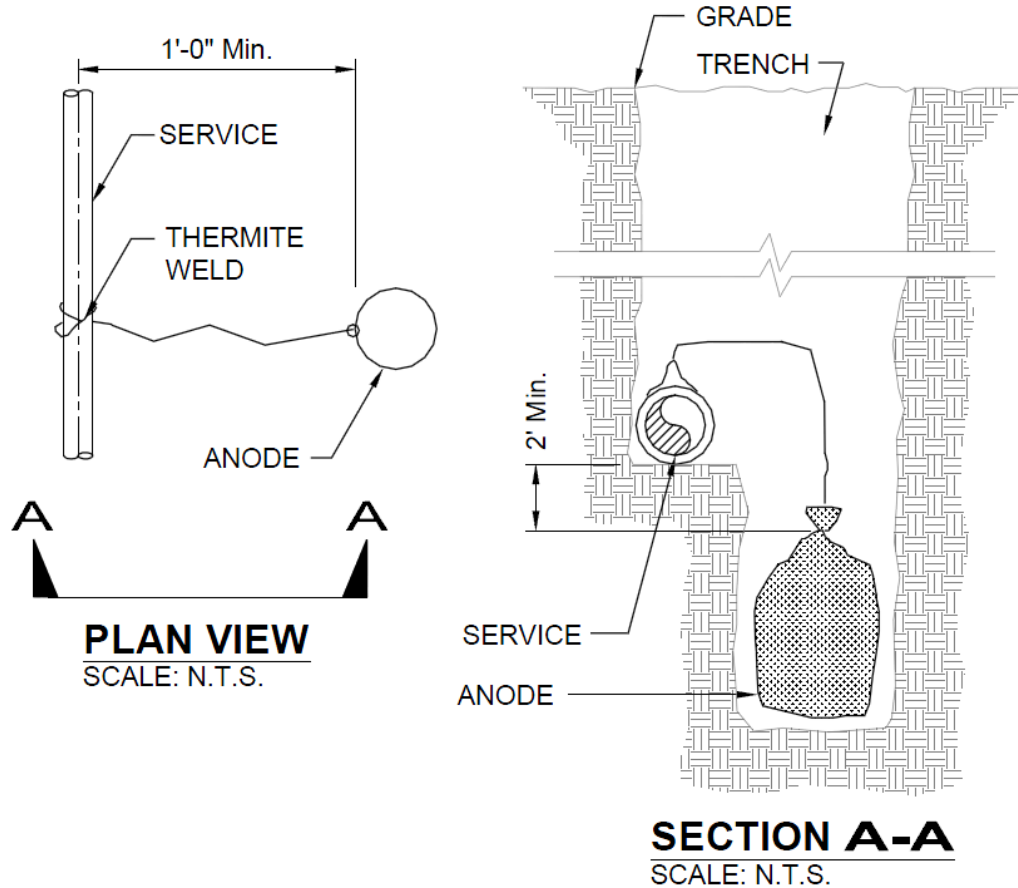
1001

D. Anode Installation (Mains Without Test Station)

1. See Detail 1002.
2. Anodes shall be installed as shown when they are installed simultaneously with new coated steel mains or when repairing a corrosion leak in bare or coated steel mains.
3. All exposed bare mains shall be cleaned, coated and with one of the approved maintenance and repair coatings as listed in these Standards.
4. When a corrosion leak is repaired on a steel main, a 17 pound anode shall be attached at that point unless it is known that a previously installed anode is within 10 feet or that a rectifier is located within 1,000 feet.



E. Anode Installation (Service Lateral with Test Station)

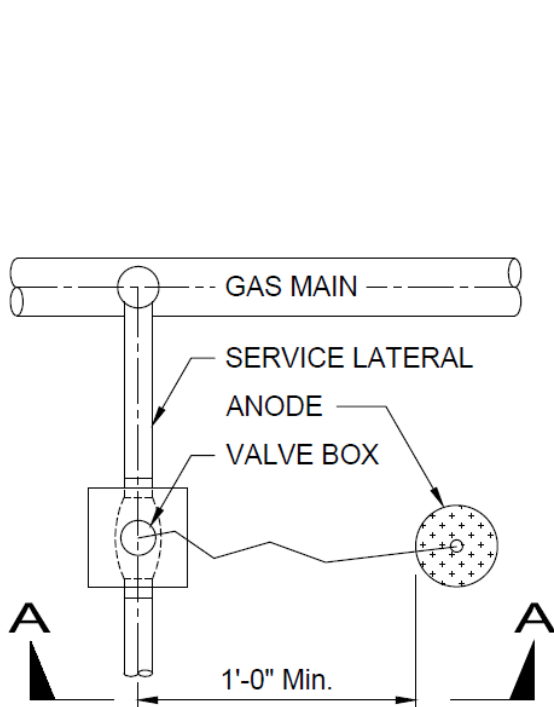
1. See Detail 1003.
2. Anodes used as a test wire connected to a steel service on a main shall be installed as shown in the detail.
3. If service has no valve, located test box 2 feet back of curb or on the property line where no curb exists
4. Locate the anode at the maximum distance of 10 feet from the main where possible.



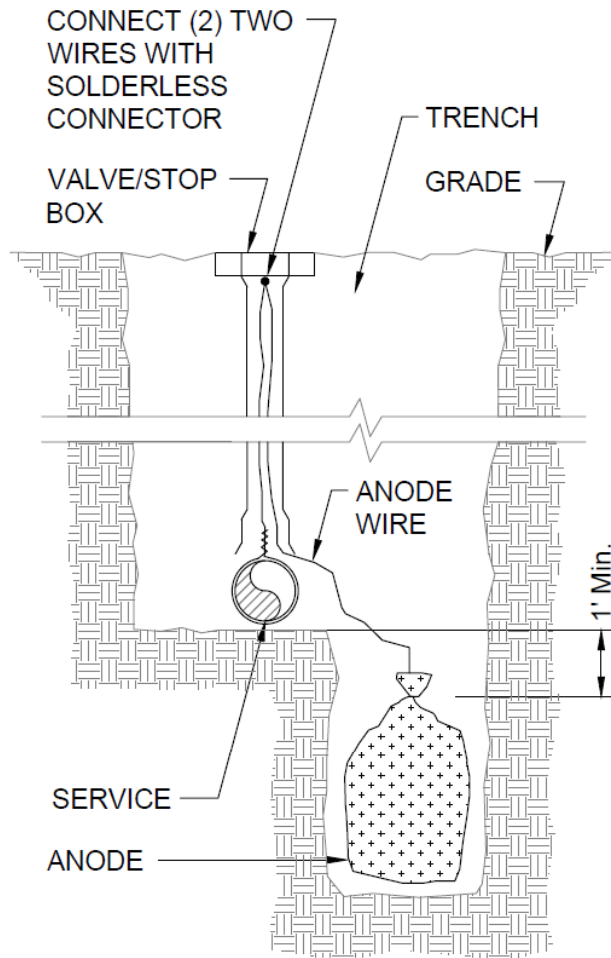
NOTES:

1. ANODES ARE 17 POUND PRE-PACKAGED MAGNESIUM WITH MINIMUM 10' INTEGRAL CABLE, #8 OR #10 STRANDED WITH HWMPE JACKET BY NORTON, BAC OR APPROVED EQUAL.
2. INSTALL ANODE BELOW WATER TABLE IF POSSIBLE.

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PLAN VIEW
 SCALE: N.T.S.



SECTION A-A
 SCALE: N.T.S.

NOTES:

1. ANODES ARE 17 POUND PRE-PACKAGED MAGNESIUM WITH MINIMUM 10' INTEGRAL CABLE, #8 OR #10 STRANDED WITH HWMPE JACKET BY NORTON, BAC OR APPROVED EQUAL.
2. INSTALL ANODE BELOW WATER TABLE IF POSSIBLE.
3. ANODE WIRE TO BE RUN INSIDE STOP/VALVE BOX.



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**ANODE INSTALLATION
 SERVICE LATERAL
 WITH TEST STATION**

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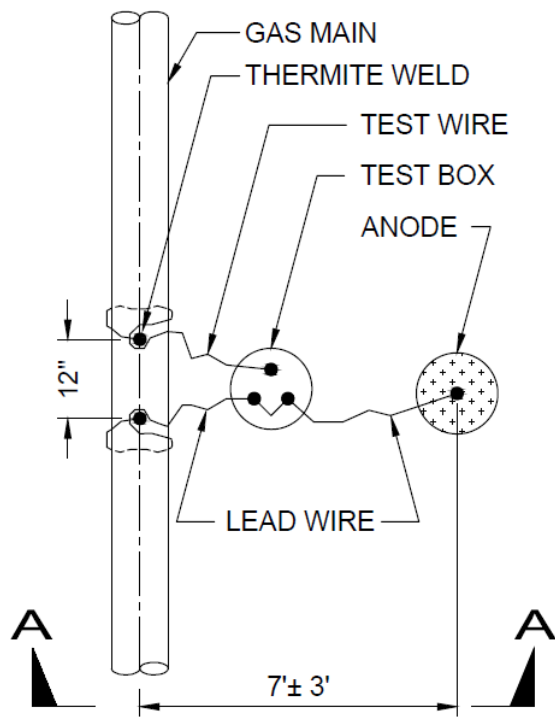
REEDY CREEK
 IMPROVEMENT DISTRICT

FIGURE:

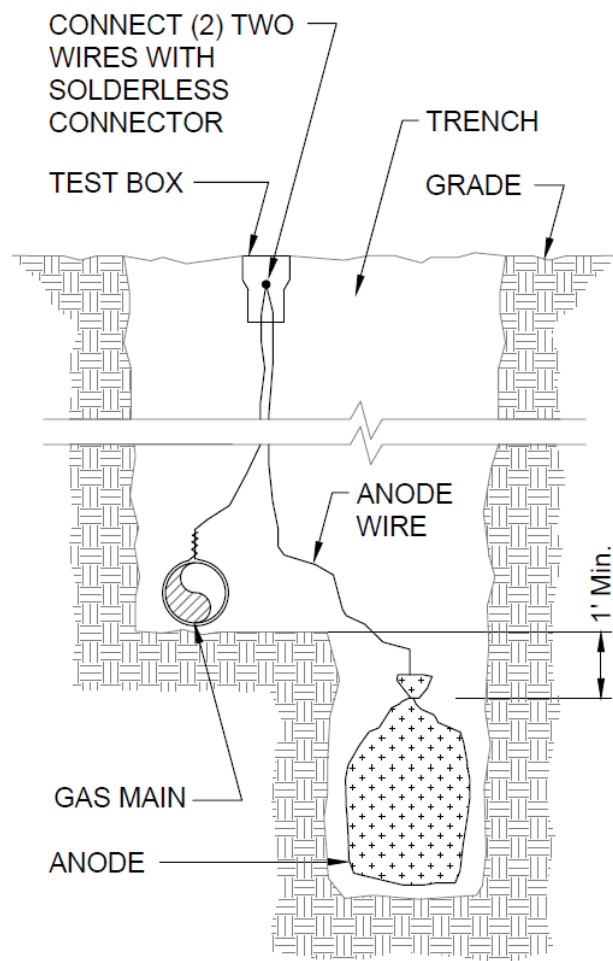
1003

F. Anode Installation (Main with Test Station)

1. See Detail 1004.
2. Anodes used as a test wire connected to a steel main shall be installed as shown in the detail.
3. Locate the anode at the maximum distance of ten (10) feet from the main where possible and below the water table.





PLAN VIEW
 SCALE: N.T.S.



SECTION A-A
 SCALE: N.T.S.

NOTES:

1. ANODES ARE 17 POUND PRE-PACKAGED MAGNESIUM WITH MINIMUM 10' INTEGRAL CABLE, #8 OR #10 STRANDED WITH HWMPE JACKET BY NORTON, BAC OR APPROVED EQUAL.
2. INSTALL ANODE BELOW WATER TABLE IF POSSIBLE.
3. LOCATE TEST BOX 2'-0" BACK OF CURB OR ON PROPERTY LINE WHERE NO CURB EXISTS.
4. TEST BOX MAY BE MOUNTED ABOVE GROUND WITH PRIOR APPROVAL FROM THE RCES GAS ENGINEER.

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	6			FIGURE: 1004
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G. Anode Installation (Addition to Existing Test Wire)

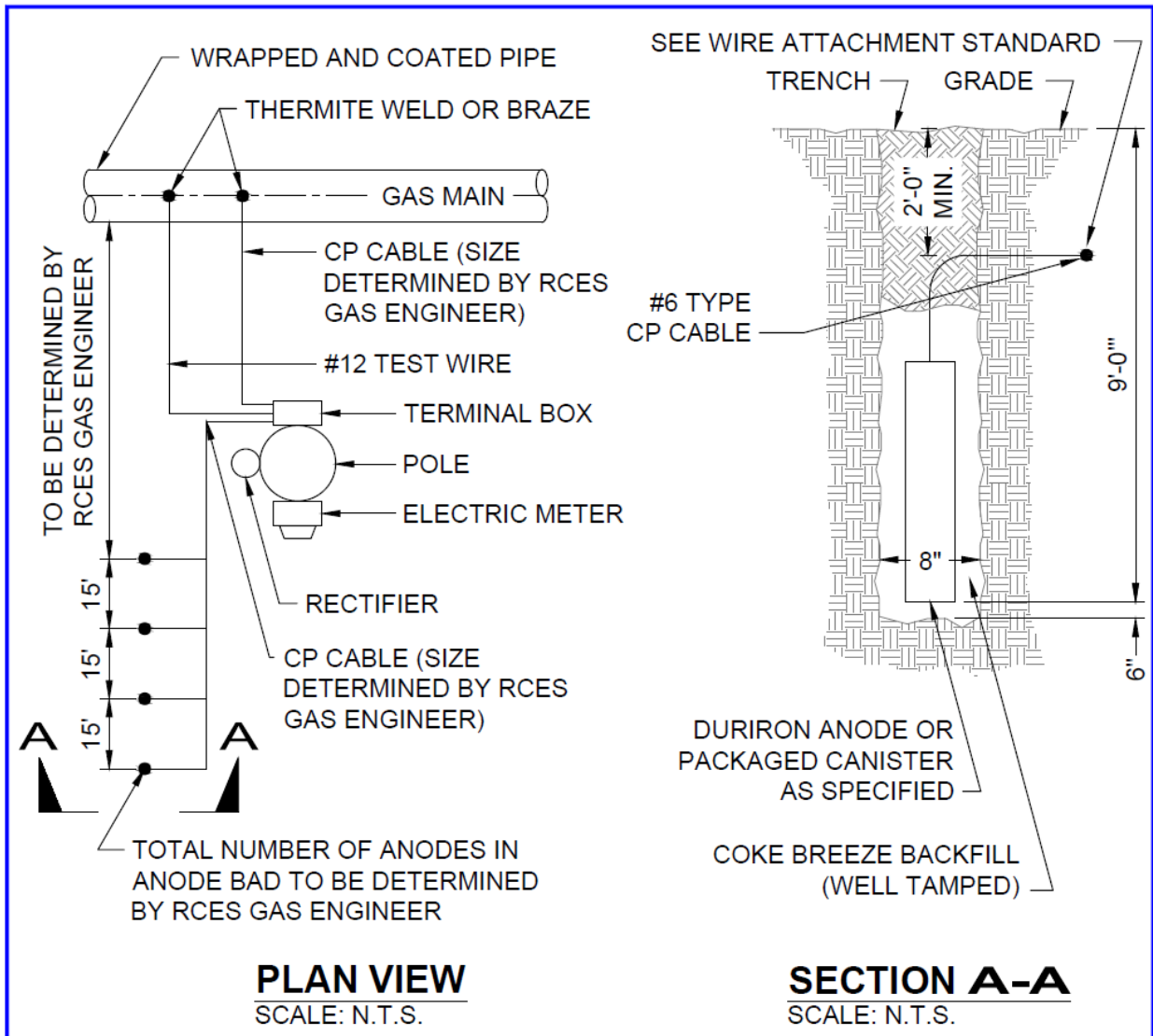
The addition of an anode to an existing test wire on the main or service lateral shall be installed in conformance with Sections 1005.C and 1005.D of Standard 1000.

H. Rectifier Installation – General Requirements

1. A lightning arrestor shall be installed to protect the rectifier input.
2. All underground electrical connections shall be made watertight.
3. The rectifier unit shall be bonded to a grounding electrode such as:
 - a. Pipe electrodes – ¾" NPS bare steel pipe driven 8 feet deep.
 - b. Rod electrodes – 5/8" O.D. steel or iron rod driven 8 feet deep.



I. Rectifier Installation Anode Bed

1. See Detail 1005 and Detail 1012.



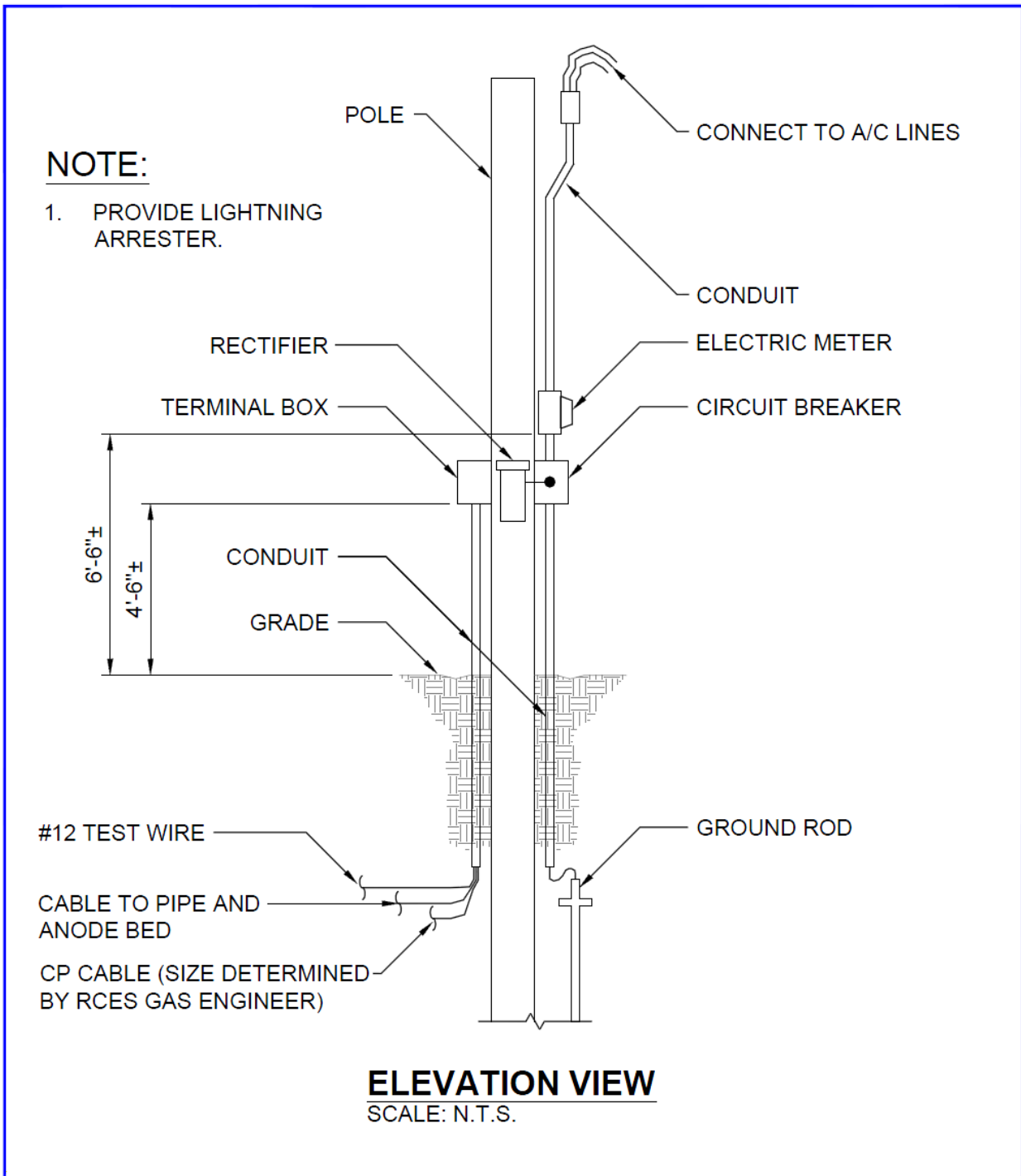
NOTES:



1. ANODES ARE 17 POUND PRE-PACKAGED MAGNESIUM WITH MINIMUM 10' INTEGRAL CABLE, #8 OR #10 STRANDED WITH HWMPE JACKET BY NORTON, BAC OR APPROVED EQUAL.
2. INSTALL ANODE BELOW WATER TABLE IF POSSIBLE.
3. LOCATE TEST BOX 2'-0" BACK OF CURB OR ON PROPERTY LINE WHERE NO CURB EXISTS.

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J. Rectifier Installation – Overhead Electrical Supply

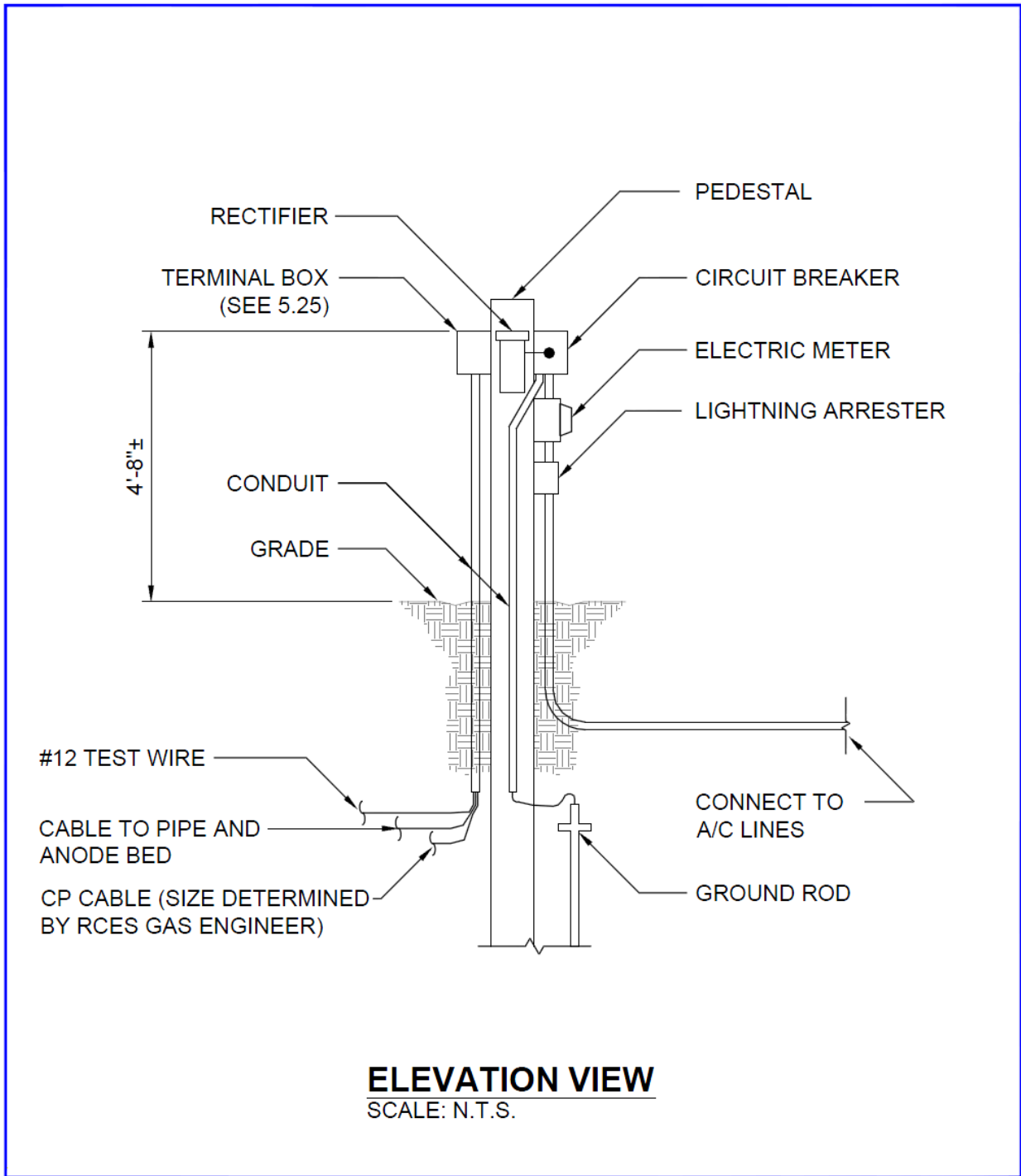
1. See Detail 1006.
2. Pole length to be specified in the contract documents, however, set pole 5 feet deep plus 1 foot of additional depth for 5 feet over 25 feet in length.





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K. Rectifier installation – Underground Electrical Supply

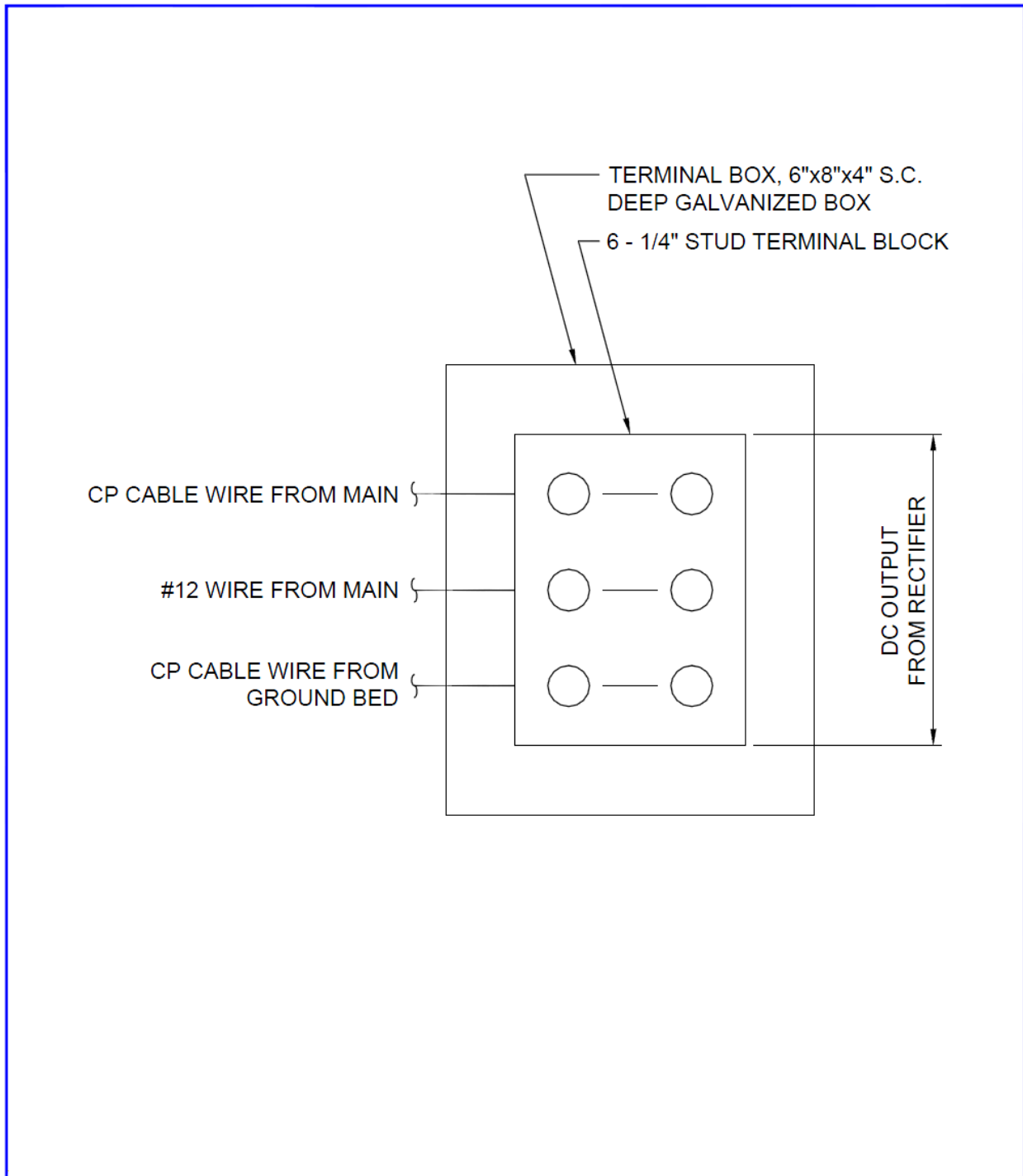
1. See Detail 1007.





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	6			FIGURE: 1007
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L. Terminal Box for Rectifier Installation

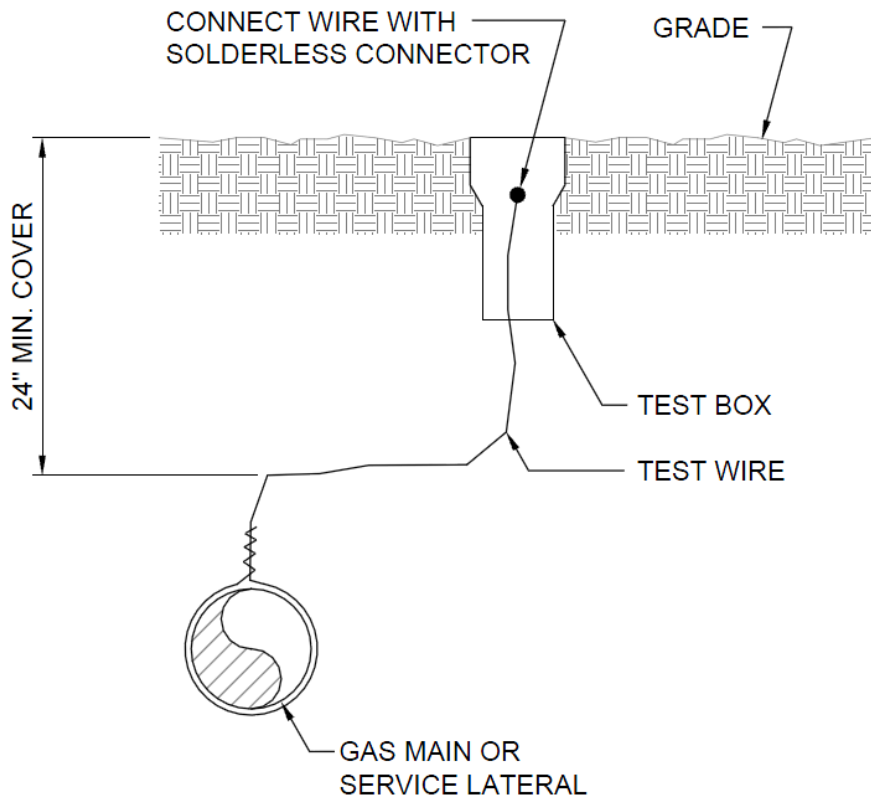
1. See Detail 1008.
2. Lightning arrestor (rare gas or equivalent) shall be installed as specified in the contract documents or by the Corrosion Design Engineer.



 ACES <small>REEDY CREEK ENERGY SERVICES</small> Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	TERMINAL BOX FOR RECTIFIER INSTALLATION			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
				FIGURE: <div style="text-align: center; font-size: 24pt; font-weight: bold;">1008</div>
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M. Main or Service Lateral Test Stations

1. Grade Test Box – See Detail 1009.
2. All test wires shall be No. 12 AWG unless otherwise specified.
3. Allow enough spare wire to project 12 inches above the top of the box.




NOTE:

1. TO FACILITATE LOCATION IN CERTAIN AREAS, AS SPECIFIED BY THE RCES GAS ENGINEER.



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TEST STATION DETAIL

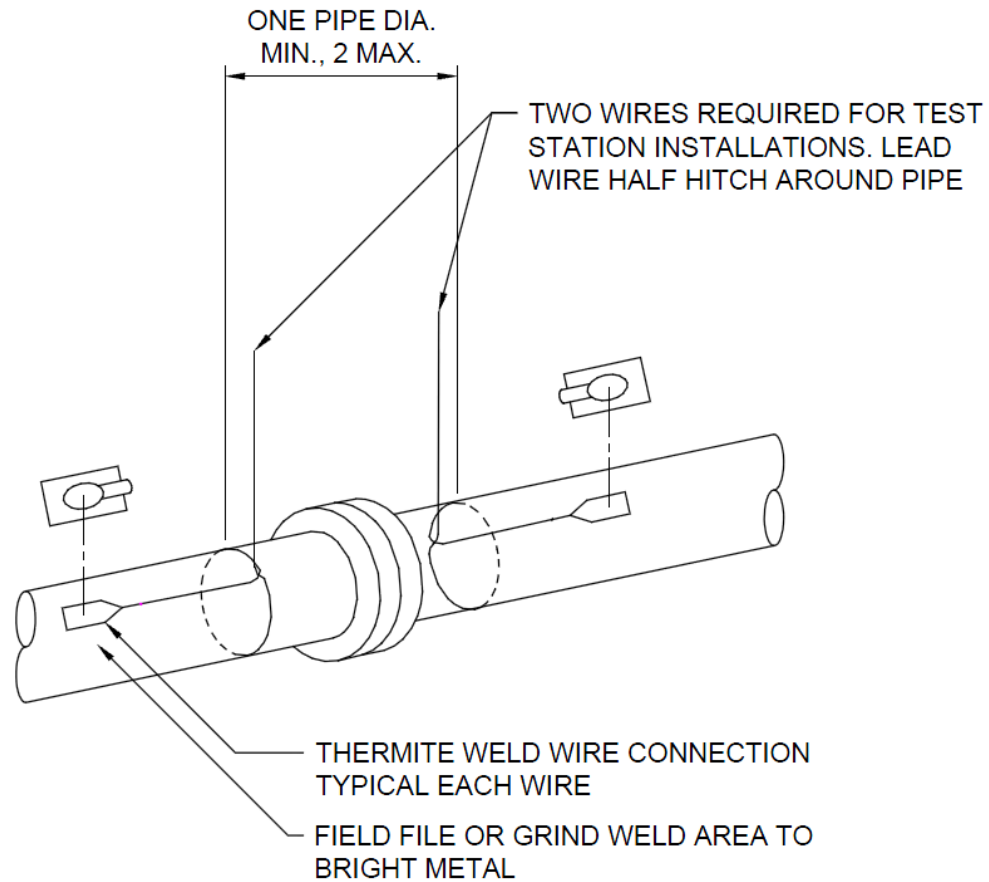
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FIGURE:
1009

N. Wire Attachment

1. Typical Lead Wire Connection – See Detail 1010.
2. To steel main or steel service lateral – See Detail 1011.
3. Control Point at an insulating feature such as a flange, coupling or similar – See Detail 1011.
4. At two (2) mains in close proximity to or crossing each other – See Detail 1012.
5. Magnesium Anode Bank – See Detail 1012.
6. Magnesium Anode Bank Connection – See Detail 1012.
7. Wire Splices – See Detail 1013.
8. Rectifier Anode Connection – See Detail 1005.
9. Pipe shall be cleaned to bare metal prior to thermite welding. After thermite welding, the pipe shall be carefully coated and wrapped including the bare portion of the wire.
10. A copper sleeve over the end of the bare wire shall be used when thermite welding No. 10 AWG and smaller wire to the pipe.



NOTES:


1. COPPER SLEEVE REQUIRED FOR THERMITE WELDING OF #10 AWG AND SMALLER WIRE.
2. USE COPPER SLEEVE ON #8 AWG JOINT BONDING WIRES.
3. WELDER AND CARTRIDGE SIZE VARIES ACCORDING TO WIRE SIZE AND PIPE MATERIAL. CONSULT WELDER MANUFACTURER FOR RECOMMENDED WELDER AND CARTRIDGE.
4. COAT WELD AREA AND FILL RECESS ON THERMITE WELD CAP WITH COLD APPLIED COAL TAR MASTIC AND APPLY CAP TO WELD.



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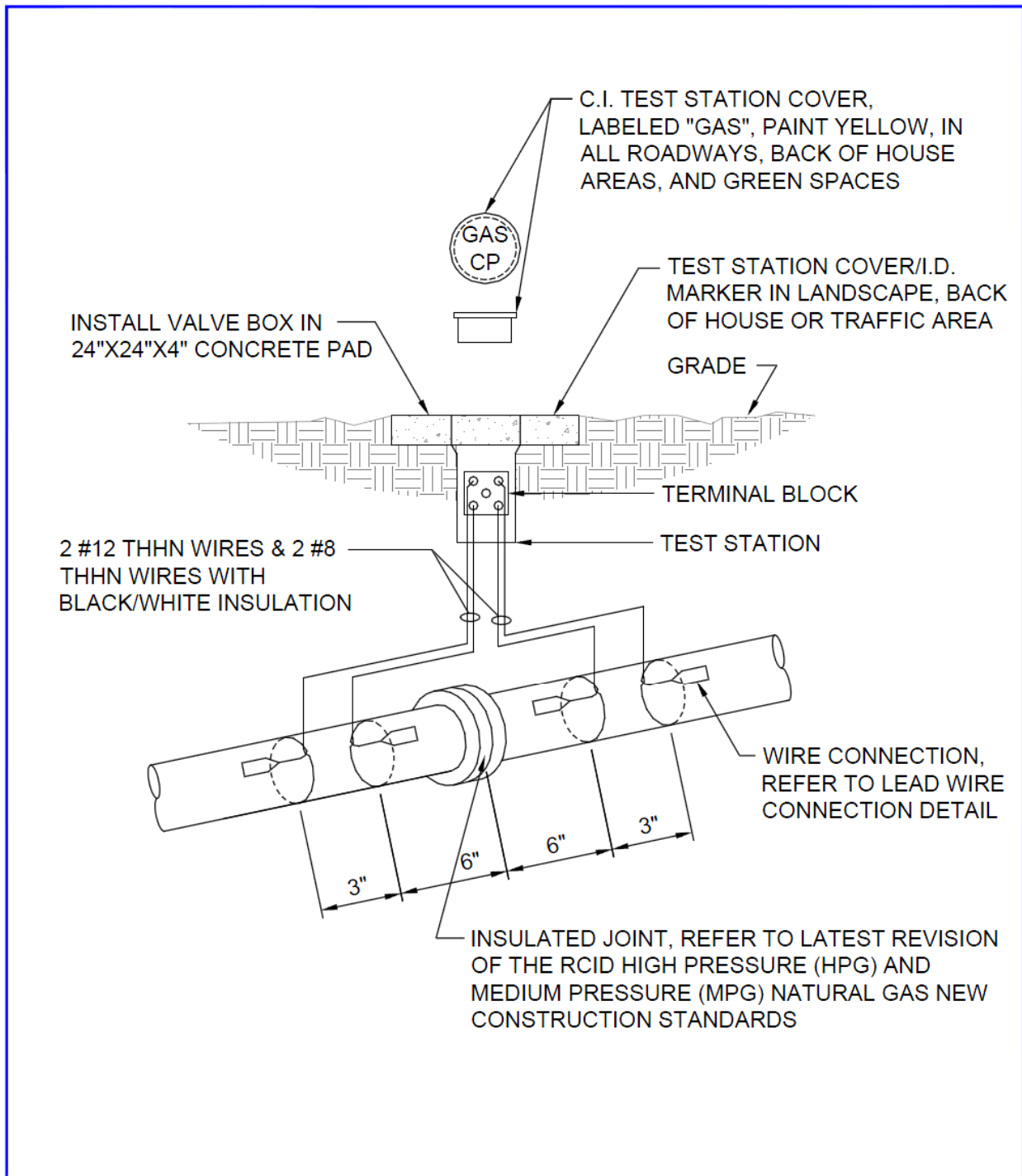
LEAD WIRE CONNECTION DETAIL			
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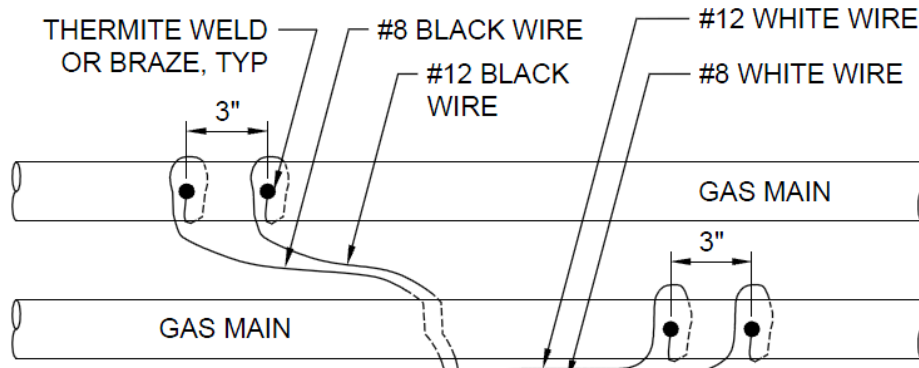
FIGURE:
1010



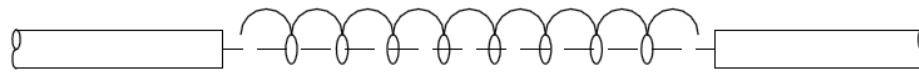
ACES
 REEDY CREEK ENERGY SERVICES
 Mechanical Engineering Department
 (407) 824-4943, P.O. BOX 10000,
 Lake Buena Vista Florida 32830-1000
 Certificate of Authorization No. 27841

WIRE ATTACHMENT DETAIL			
6			
5			
4	BLT	6/1/2016	GAS MANUAL UPDATE
ISSUE	APPR	DATE	ISSUED FOR

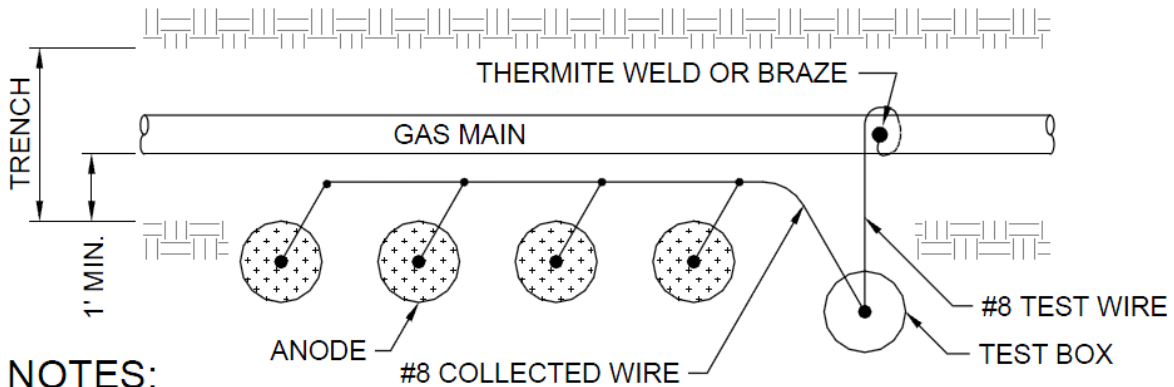
DESIGNED FOR:
 REEDY CREEK IMPROVEMENT DISTRICT
 FIGURE:
1011



BRING UP ALL 4 WIRES TO A #22 PLASTIC UPPER SECTION, OR FENCE POST TERMINAL AS SPECIFIED BY RCES GAS ENGINEER. WIRES TO BE INDIVIDUALLY WRAPPED





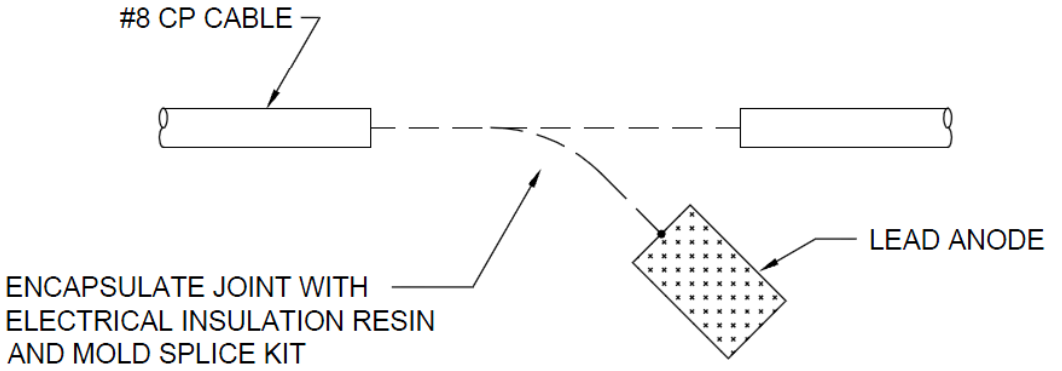
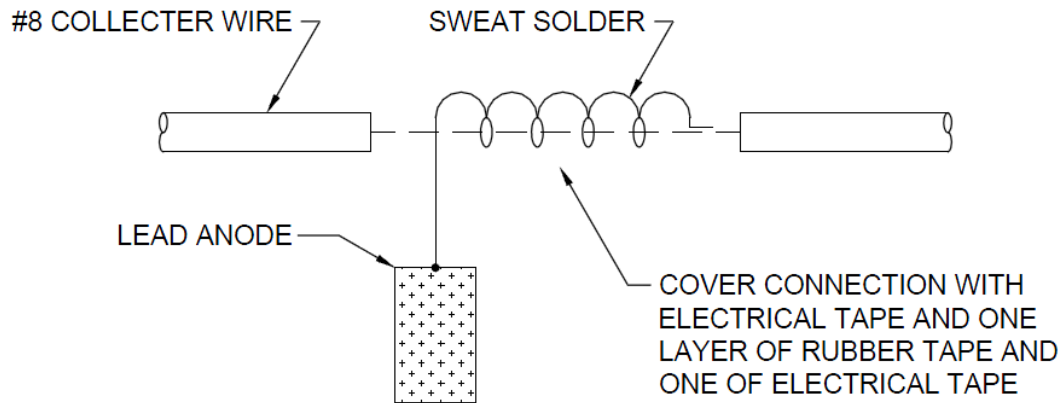
"WESTERN UNION" TYPE SPLICE SWEAT SOLDERED COVER SPLICE WITH ELECTRICAL COATING AND ONE LAYER OF RUBBER TAPE AND ONE OF ELECTRICAL TAPE



NOTES:


1. ENDS OF BLACK WIRE SHALL BE COLOR CODED USING 1/2" WIDE COLOR CODING TAPE.
2. ANODE BANK CAN BE INSTALLED AT RIGHT ANGLES TO THE MAIN OR AS SHOWN.

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WIRE SPLICES				
6				
5				
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 FIGURE:
1013

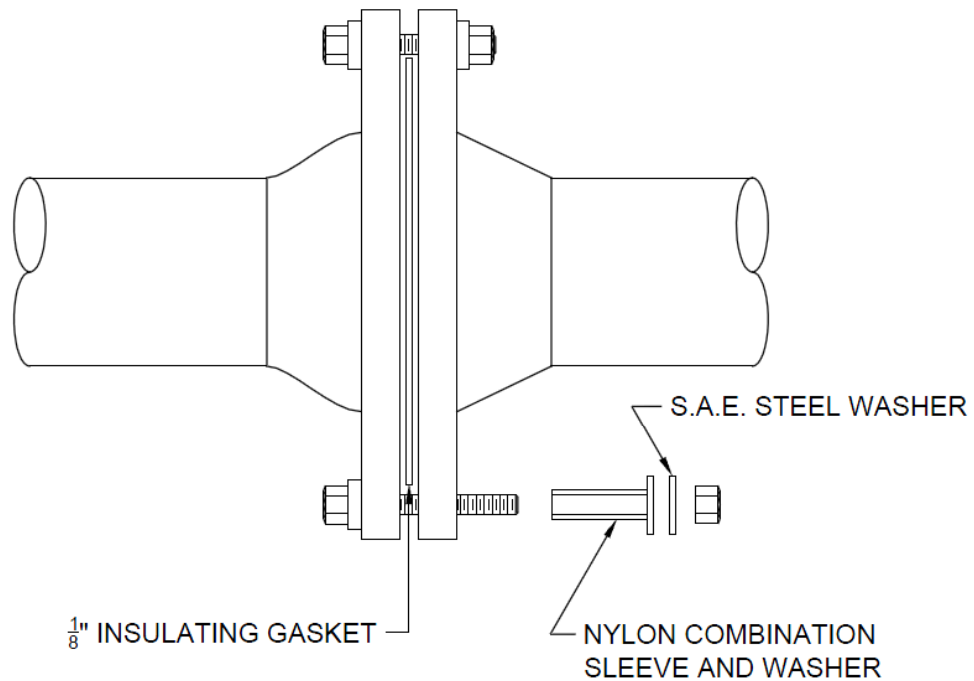
1006 INSULATING FITTINGS

A. Location on New Service Laterals

1. Install an insulating fitting at the service valve nearest the main.
2. Use an insulating flange or a weld-in insulating coupling if the service lateral is too small for a flange.
3. Compression couplings may be used when specified by the Corrosion Design Engineer and approved by the RCES Gas Engineer.

B. For use on Mains:

1. Insulating Flange Set – See Detail 1014.
 - a. Use for steel-to-steel insulating connection at valves and at other locations specified.
 - b. Where insulating flange set is aboveground, both ends of the bolt shall be insulated.
 - c. To assure proper alignment of the bolt holes and to prevent excessive stress on the insulating bolt sleeves, the use of the insulating flange to make the final connection should be avoided.
 - d. Where it is necessary to use pipe sealant to hold the gasket in place, the pipe sealant shall be of the non-metallic, non-conducting type.
 - e. Where the insulated flange set is in direct burial, the space between the flange faces shall be filled with mastic and sealed with a circumferential wrap of tape or mastic and glasswrap.



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INSULATION FLANGE SET			
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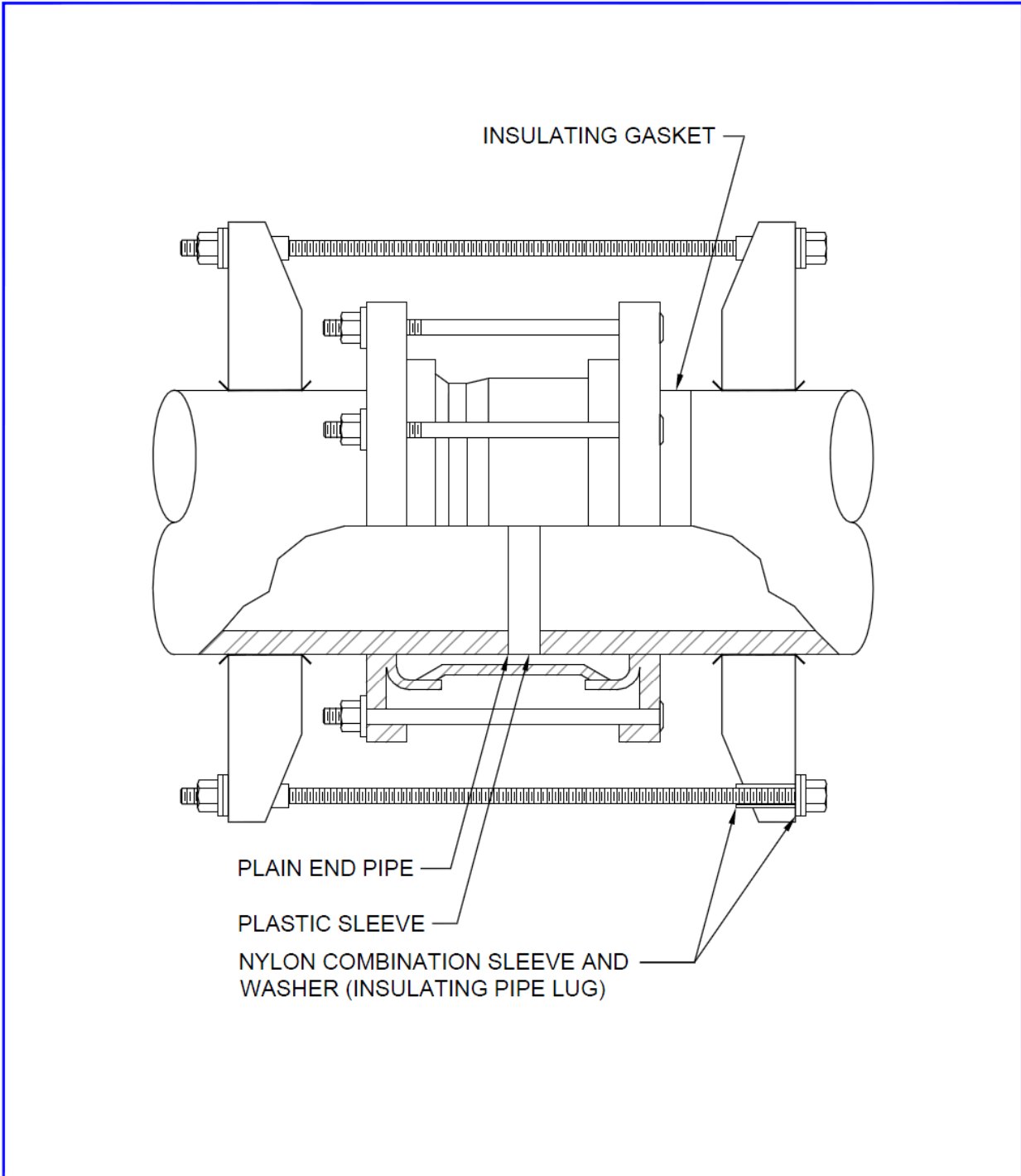


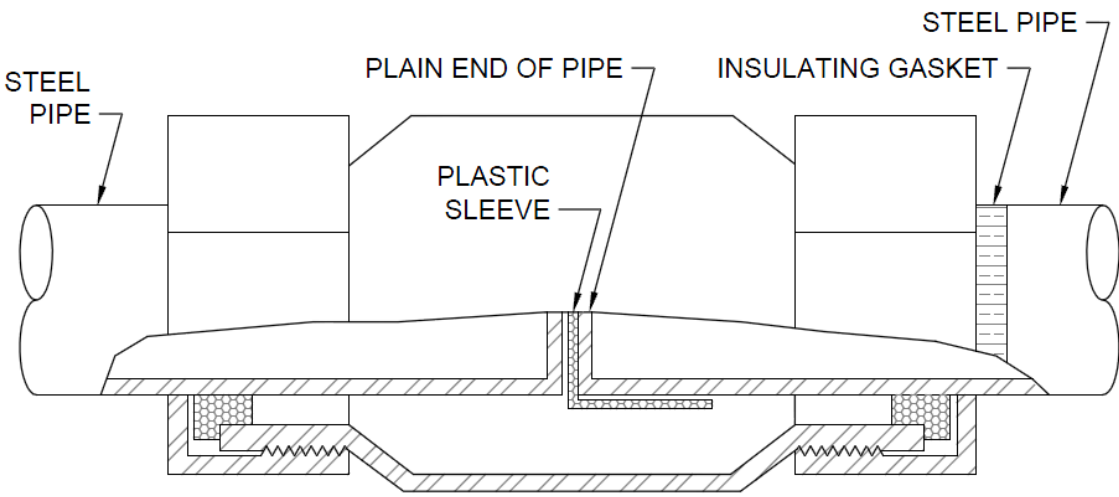
 **REEDY CREEK
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FIGURE:
1014

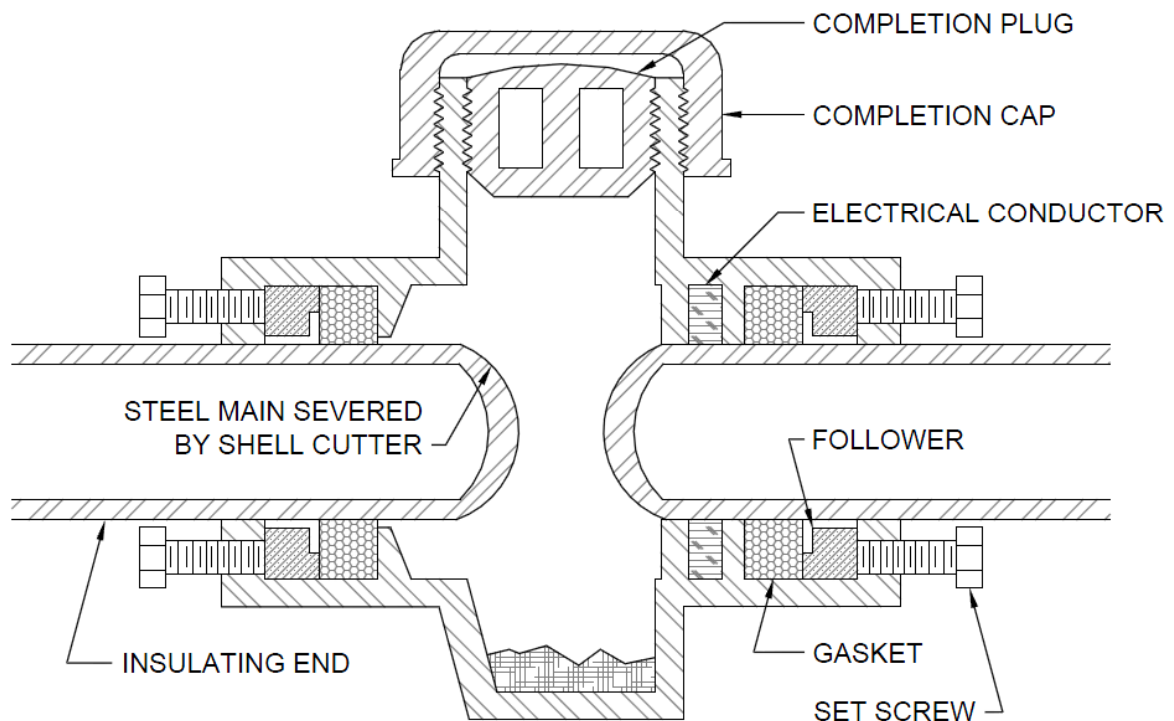
2. Insulating Compression Coupling – May used only when specified by the Corrosion Design Engineer and approved by the RCES Gas Engineer.
 - a. Use for cast-iron to steel transition or steel-to-steel insulating connection. Remove all burrs and sharp edges from piping on side where plastic insulating sleeve will be installed.
 - b. See Detail 1015 for a bolt-type coupling.
 - c. See Detail 1016 for a nut-type coupling.
 - d. See Detail 1016 for a hot-tap type coupling.



 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	INSULATING COMPRESSION COUPLING BOLT TYPE			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
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STEEL TO STEEL NUT-TYPE COUPLING



INSULATING SLEEVE



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**INSULATING COMPRESSION COUPLING
 NUT AND HOT TAP**

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ISSUE	APPR	DATE	ISSUED FOR

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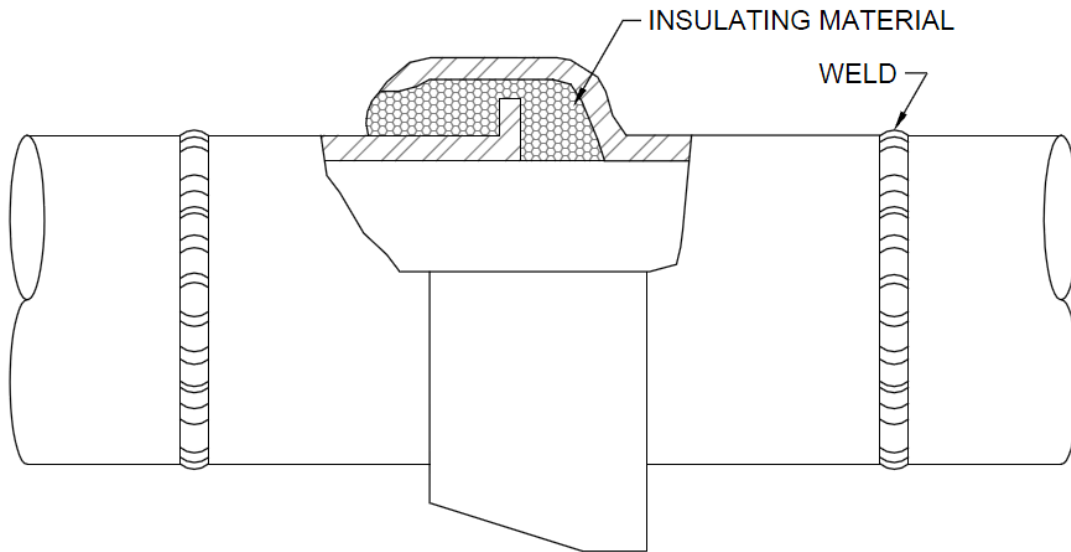
REEDY CREEK
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FIGURE:

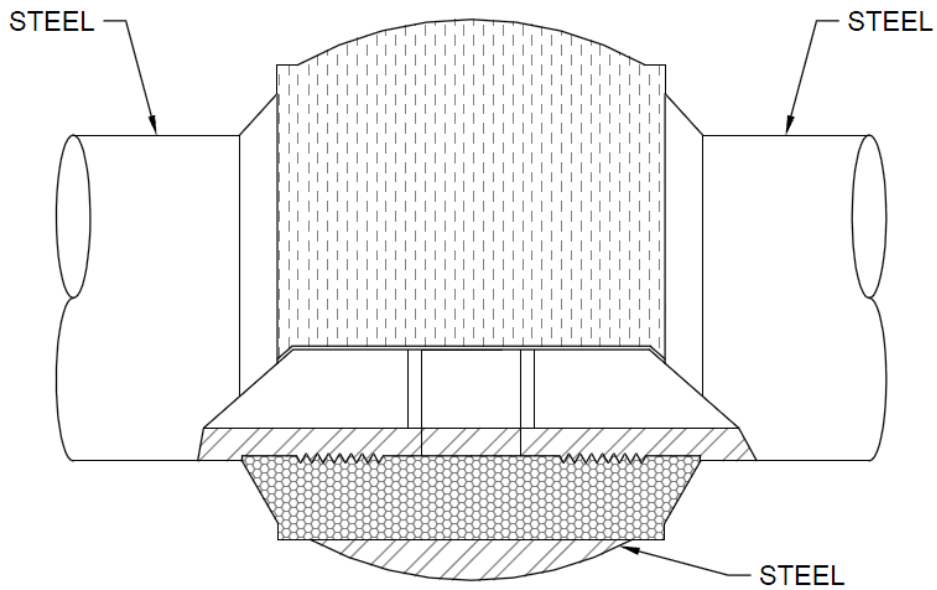
1016

3. Weld-in Insulating Couplings

- a. See Detail 1025 for Type P.
- b. See Detail 1025 for Type K.



WELD IN-LINE INSULATOR



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INSULATING CONNECTIONS

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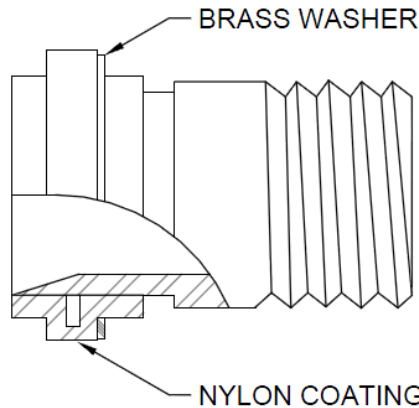
**REEDY CREEK
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FIGURE:

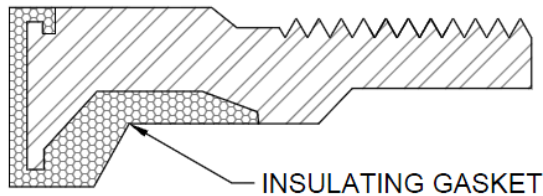
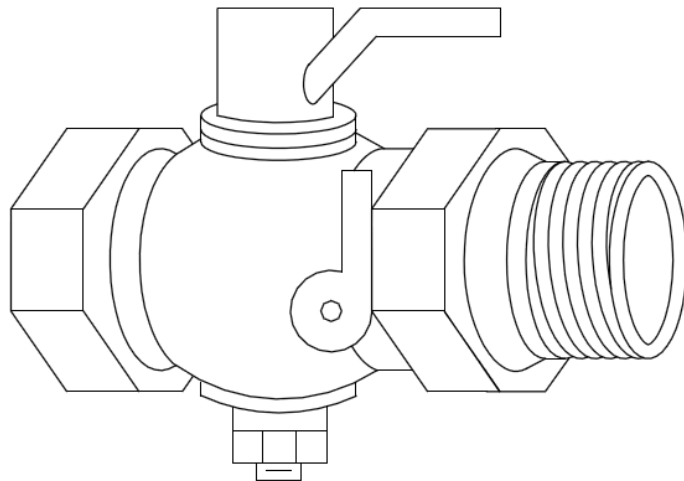
1017

C. For Use on Meter Installations

1. For larger industrial or other meter/regulator assemblies using flanged valves, etc., insulation shall be by use of an insulating flange set.
2. Outside low to moderate capacity meter installation – use an insulating inlet meter swivel with all single and dual hard-case meter installations which utilize meter swivels. See Detail 1018.
3. Outside low to moderate capacity meter installations, single, dual, or multiple low to moderate capacity meter assemblies, use an insulating meter stop. See Detail 1018.



INSULATING INLET METER SWIVEL



INSULATING METER STOP



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INSULATING METER SWIVEL

DESIGNED FOR:



**REEDY CREEK
 IMPROVEMENT DISTRICT**

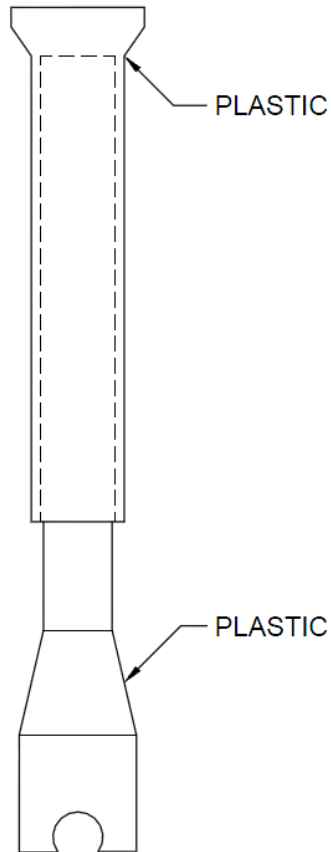
FIGURE:

1018

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4	BLT	6/1/2016	GAS MANUAL UPDATE
ISSUE	APPR	DATE	ISSUED FOR

D. Valve and Test Boxes

1. Valve box 5-1/4" – Use to insulate main or service from stop box and for control point leads and for larger valve boxes. See Detail 1019.
2. Stop Box 3" – Use to insulate service from test box and for test wire leads. See Detail 1019.



STOP BOX

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TERMINAL BOX TEST POINTS			
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 **REEDY CREEK
IMPROVEMENT DISTRICT**

FIGURE:
1019

1100 WELDING – MANUAL OXY-ACETYLENE PROCESS

1101 SCOPE

This Standard establishes the requirements for the qualification of the welding procedure, welder qualifications and field welding using the manual oxyacetylene process for butt-welded joints in pipe, valves, weld neck flanges and fittings; and fillet-welded joints in pipe branches, slip-on flanges, socket-weld fittings, etc. as applied in pipelines and connections to apparatus or equipment. This process is limited to pipe and fittings 2" NPS and smaller.

1102 GENERAL

The contents of this Standard conform to the requirements of Part 192, Chapter 1 in Title 49, Code of Federal Regulations; American Petroleum Institute Standard API-1104, editions as required by the above and other provisions contained herein.

1103 QUALIFICATIONS OF WELDING PROCEDURE

A. Procedure

1. Process – The welding shall be done by the manual oxyacetylene process.
2. Pipe and Fitting Material shall conform to:
 - a. Pipe – API Standard 5L Grade B, API Standard 5LX, Grades X42, ASTM A53 Grade B, or ASTM A106.
 - b. Flanges and Fittings – ASTM A234, ASTM A181, ASTM A105 ANSI B16.5, ANSI 16.11 or MSS SP63.
 - c. This procedure shall also apply to materials with chemical and mechanical properties which comply with the foregoing, even though they are not manufactured in conformance with them.

3. Diameter Group – Wall Thickness Group Combination

This procedure shall apply to butt welds and fillet welds pipe, flanges, and fittings in the following groups:

Nominal Size (NPS)	Wall Thickness
1/2"	0.109"
3/4"	0.113"
1"	0.133"
1-1/4"	0.140"
1-1/2"	0.145"
2"	0.154"

4. Joint Design

All joints shall conform to the requirements of Standard 1300.

5. Filler Metal

- a. The size and classification numbers of filler metal shall conform to Standard 1300.
- b. The rods shall be free of rust and any foreign material that may be detrimental to the weld.

6. Tack Weld

Where 50% of the weld cannot be completed in equal segments on opposite sides of the weld joint without repositioning the line-up clamps, tack welds shall be used as follows:

- a. Following proper alignment, joints shall be tack welded as shown in Standard 1300 so that the spacing and alignment can be maintained during welding operation.
- b. Tack welds shall be a maximum of three times the pipe wall thickness in length and two-thirds the pipe wall thickness in depth at the center of the tack.
- c. The tack weld sail slope from its center to the bottom of the "V" groove at either end so that the welding puddle can be readily carried over.
- d. All tack welds shall be thoroughly fused to the completed weld joint.

7. Nature of Flame

The flame shall be adjusted to the near neutral condition with a slight excess amount of acetylene to assure the absence of an oxidizing flame which adversely influences the weld quality.

8. Position

a. Butt Weld

The axis of the pipe to be welded shall be in a fixed horizontal position.

b. Fillet Weld

i. Small Branch – The axis of the header pipe shall be in a fixed horizontal position and the branch pipe axis shall extend vertically upward from the header.

ii. Full Size Branch - The axis of the header pipe shall be in a fixed horizontal position and the branch pipe axis shall extend vertically downward from the header.

c. The pipe for all tests shall remain in the fixed position until the welds are completed and cooled to a temperature of 200 degrees F or lower.

9. Direction of Welding

Butt welding shall be done in the uphill direction with the pipe in the fixed horizontal position. Either the backhand or forehand welding technique may be used for branch fillet welds.

10. Number of Welders

No more than one welder shall be used on any one weldment under this procedure.

11. Number of Passes

The welding puddle shall take up the entire width and depth of the groove or gap as it is carried around the joint so that the entire weld is completed with a single layer of filler material.

12. Type of Line-Up Clamps

a. The butt weld joint shall be held in alignment for welding by approved external clamps.

b. The socket weld and fillet weld joints shall be centered in the socket.

13. Removal of Line-Up Clamps

External line-up clamps shall be held in place until three (3) or more tack welds have been made or until 50% of the weld has been completed.

14. Cleaning

Surfaces for welding shall be clean of all rust, scale, primer, oil or other materials that may be detrimental to the finished weld.

15. Speed of Travel

Welding shall be performed at the rate of approximately one inch per minute.

16. Preparation of welding test joints, type and number of specimens, removal of test specimens, removal of test specimens and test results shall conform to the requirement of API Standard 1104, 20th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008).

1104 WELDER QUALIFICATION

A. General

1. The qualification test welds made by each welder shall be conducted in the presence of a qualified observer approved by the RCES Gas Engineer.
2. The actual examination of the welds may be made wherever proper testing facilities and personnel qualified to make an examination are available.
3. Material and methods used for welder qualifications shall conform to those in "Qualifications of Welding Procedures," Section 1103 of this Standard.

B. Qualification Tests

To qualify under this Standard a welder shall successfully complete the following tests:

1. Multiple Qualification

a. Butt Weld

The welder shall make a butt weld joining two pieces of pipe of the following diameter group-wall thickness group combinations with the pipe in the fixed horizontal position.

2" NPS x 0.154" wt.

b. Fillet Weld

i. Full Size Branch

The welder shall make a fillet weld joining two pieces of pipe of the following diameter group-wall thickness groups combinations with the axis of the header pipe in the fixed horizontal position and the branch pipe axis extended vertically downward from the header.

2" NPS x 0.154" wt.

ii. Small Branch

The welder shall make a fillet weld joining one 1/2" or 3/4" service tee with its axis extending vertically upward from a 2" NPS header which has its axis in the fixed horizontal position.

- c. A welder who has successfully completed the tests required in a and b of this Section shall be qualified to weld in all positions, on all wall thicknesses, joint designs, fittings and on pipe diameters 2" NPS or less.

2. Root Bend Test Requirements – Butt Welds

- a. If a crack or other defect exceeding 1/8" inch (0.125") or one-half of the nominal wall thickness, whichever is smaller, in any direction is present in the weld or between the weld and fusion zone after bending, shall be cause for rejection.
- b. Cracks which originate along the edges of the specimen during testing and which are less than 1/4" inch (0.250") shall not be considered.
- c. Should one of the bend test specimens fail to meet these requirements and, in the opinion of the RCES Gas Department representative or qualified welding inspector serving as the RCES Gas Department's agent, the lack of penetration is not representative of the weld, the test specimen may be replaced by an additional specimen cut adjacent to the one that failed.
- d. The welder shall be disqualified if any one specimen shows defects exceeding these requirements.

3. Root Bent Test Requirements – Full Size Branch Fillet Weld

- a. Completed weld shall be visually inspected for defects.
- b. The root bend test shall be considered acceptable if the weld does not break.
- c. The welder shall be disqualified if any one specimen shows defects exceeding these requirements.

4. Small Branch Test Requirements – Fillet Weld

- a. Visual inspection shall determine the weld to be free from serious undercutting and rolled edges.
- b. The branch connection shall be capable of resisting being broken off the header using any available means.
- c. The welder shall be disqualified if in the opinion of the RCES Gas Department representative or the qualified welding inspector serving as the RCES Gas Department's agent, the specimen fails the inspection and testing requirements of a. and b. of this section.

C. Failure to Pass Qualification Tests

1. Failure to pass any given test shall disqualify the welder failing the test from performing this type of welding on any portion or component used in the system until the welder repeats and successfully passes the test which he had previously failed.
2. The failed test may be repeated immediately if in the opinion of a qualified welding inspector or qualified RCES Gas Department representative, the failure of a welder to pass the test was due to conditions beyond his control.
3. Failure for any other reason shall require the welder to submit proof of subsequent welder training acceptable to the RCES Gas Engineer for contractors or RCES Gas Utility Services Manager for company employees before the failed test may be repeated.

D. Duration of Qualification

1. A welder's qualification, subject to the limitations of the following provisions of this Section shall remain in effect for a period of six (6) months following his acceptable qualification test.
2. All welders shall possess a valid certification no more than six (6) months old. Their certificate must be valid through the duration of any project on which they perform welding procedures. The certificate must be valid in all welding processes as required by the multiple qualification tests.
3. If, in the process of one continuous has line construction project, a welder's six (6) month certificate expires, his certificate may be validated for one (1) additional six month period by removing production pipeline welds and having them destructively tested. These welds shall be picked at random by the RCES Inspector and tested to the same standards as the routine qualification tests. If the field welds fail, the welder shall be required to retake the welder multiple qualification tests and successfully pass them before being permitted to continue to weld on the project. Validation certification shall be performed in accordance with the Field Check provisions of this Section.
4. A welder how has not been engaged in welding on the RCID gas system in a given process for a period of six (6) months or more shall be disqualified in that process. He shall be permitted to repeat the qualification test without delay.
5. If, in the opinion of the RCES Inspector, RCES Gas Engineer, RCES Gas Utility Services Manager or the qualified welding inspector, there is a specific reason to question the welder's ability, the welder shall be required to repeat the qualification test.

E. Field Check

1. A field check may be performed on field or production welds, selected at random by the RCES Inspector at any time.
2. Welds shall be checked by one or more of the following methods:
 - a. Destructive (coupon) Test
 - i. Weld selected shall be butt weld made with pipe in the fixed horizontal position.
 - ii. A cylindrical section, 12" long, with the weld at mid-span, shall be removed from the pipe being installed in the presence of the RCES Gas Inspector.

- iii. Location and number of test specimens shall be the same as for the initial qualification test.
 - b. Non-destructive testing may be required.
 - c. Trepanning is prohibited.
3. Failure to Pass Field Check
- a. When a weld fails the field check using the destructive test specified in Section E. in a given welding process, a second field weld produced by the same process shall be tested immediately.
 - b. If the second weld also fails the field check, the welder shall be disqualified and prohibited from welding on any gas pipe lines using that welding process used in the failed field tests. The disqualification shall remain in effect until the welder requalified by multiple certification test.

1105 FIELD WELDING

A. General

Welding materials and procedures shall conform to those used in the Qualification of Welding Procedure, Section 1103 of this Standard.

B. Equipment

1. Welding equipment shall be of a size and type suitable for the work and shall be maintained in such condition as to provide acceptable welds, continuity of operation and safety of personnel.
2. Each welding unit shall have an approved fire extinguisher in good operating condition.
3. Each welding unit shall be equipped with a grinder and buffering machine suitable for preparing pipe joints.
4. All oxy-acetylene welding equipment shall have anti-flashback flame arrestors installed on the hand piece.
5. Any equipment failing to meet these requirements shall be repaired or replaced upon request of the RCES Inspector.

C. Preparation of Welding Edges

1. The edges or surfaces of parts to be joined by welding shall be prepared by machining, grinding, flame-cutting or filing.
2. Edges prepared by flame-cutting shall be dressed with a file or grinder to produce a smooth uniform surface before welding.

D. Mitered Joints

1. A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of 10 percent or less of SMYS may not deflect the pipe more than 15 degrees.
2. Miter joints are not permitted on pipe that operates at hoop stress of 10 percent or more of SMYS.
3. Sectioned standard fittings shall be used in lieu of miters for offsets of more than 15 degrees.

E. Tack Welds

Joints shall be tack-welded as described in Section 1103.6 to maintain proper spacing and alignment. Where 50 percent of the weld can be completed without repositioning the line-up clamps, tack welds may be omitted.

F. Puddle Control

1. Where possible, the welding shall be continuous around the joint from bottom to top so that the entire weld is completed with a single layer of filler metal.
2. The advancing edge of the puddle shall be carefully controlled so as to provide thorough fusion at the sides and bottom of the welding groove.
3. Tack welds shall be thoroughly fused with the rest of the weld but need not be melted out during the welding operation.
4. The weld shall be protected from impairment due to prevailing weather conditions such as airborne moisture, blowing winds, etc.

G. Finished Welds

1. The finished welds shall be of sound metal thoroughly fused to the-base metal.
2. Butt Welds – The crown surface shall be built-up over the pipe wall surface so there are at least 1/32" of reinforcement and an overlap of 1/16" on either side of the original beveled opening.

3. Fillet Welds – The weld shall be level or concave. Convex welds are not permitted.
4. There shall be no undercutting along the edges of the weld.

H. Defects

Before repairs are made, injurious defects shall be entirely removed to clean metal. All slag and scale shall be removed by wire brushing or grinding.

I. Roll Welding

1. Roll welding will be permitted provided alignment is maintained by use of skids or structural framework having an adequate number of roller dollies to prevent sag in the supporting lengths of pipe.
2. Roll welding shall be limited to a maximum of two welds on three full lengths of pipe.

J. Qualification Records

The RCES Engineering and the RCES Gas Department shall maintain a record of all Welder Qualification Tests showing the date and result of tests. This data will be shown on the forms in Section 1107 and/or 1108 or an equivalent approved form.

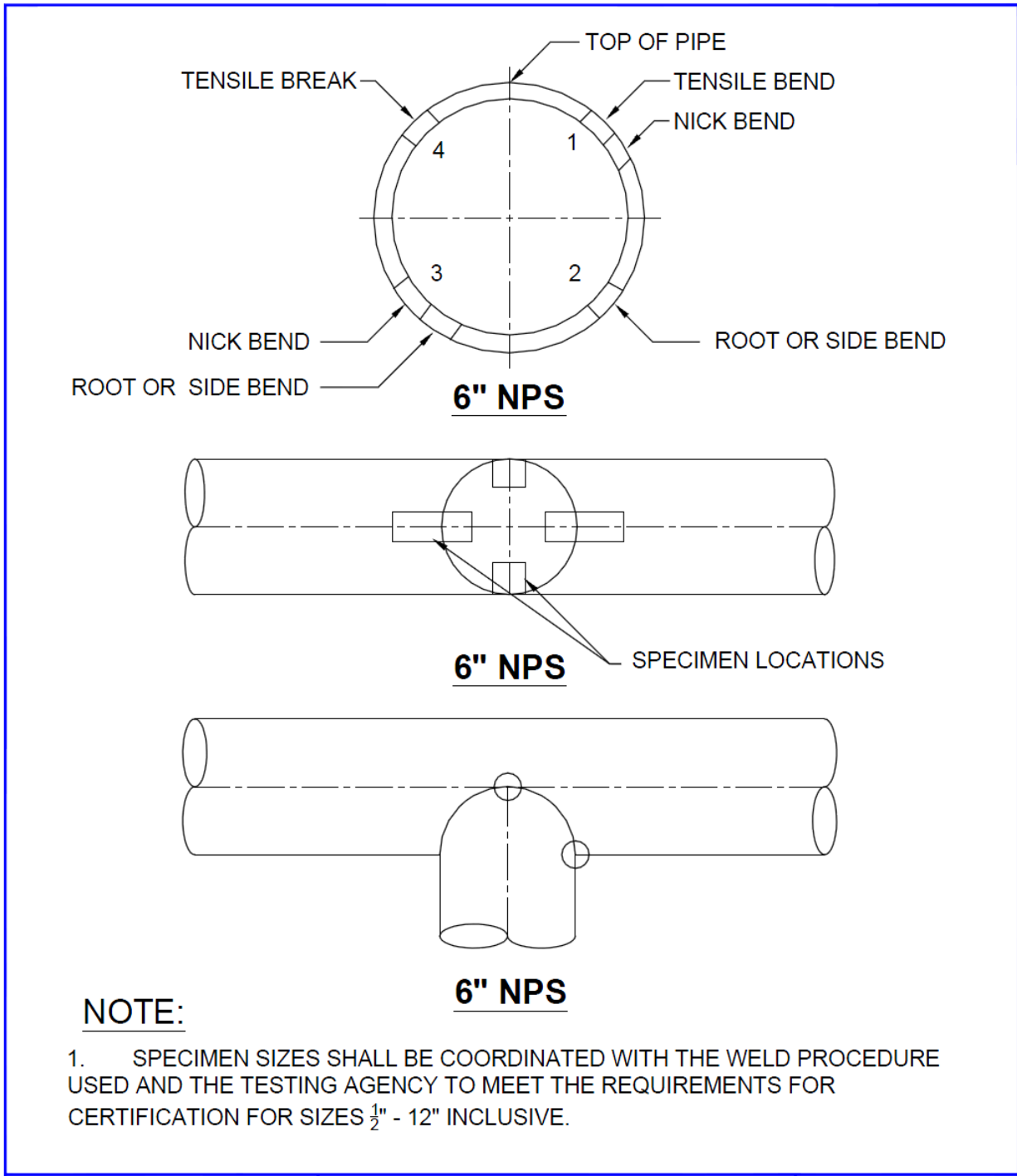
1106 TEST SPECIMENS

A. Location of the Test Specimens

1. Butt Weld – See Detail 1101.
2. Fillet Weld – See Detail 1101.



B. Preparation of Specimen for Test

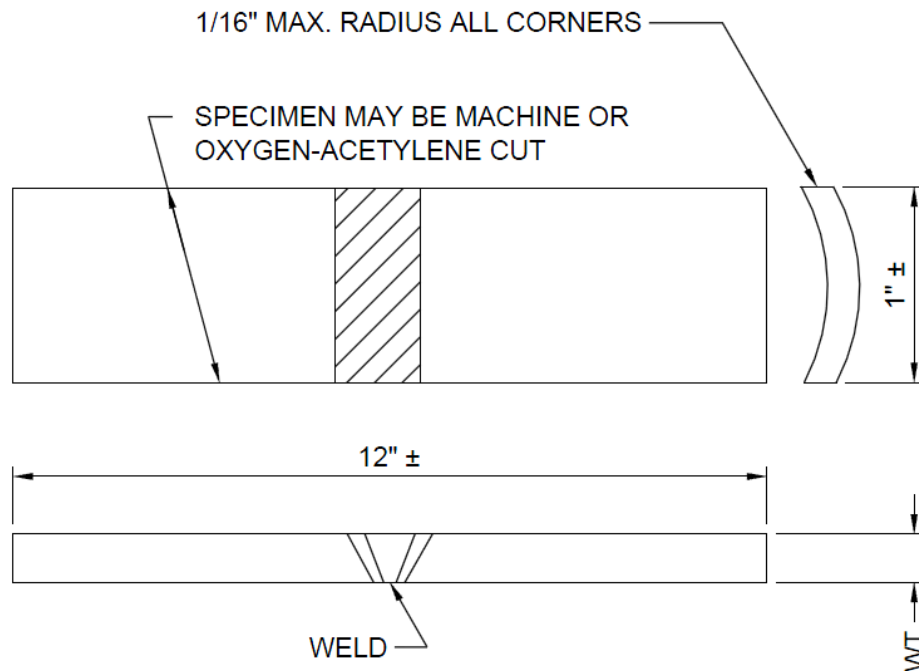
1. Root Bend Test Specimen – See Detail 1102.



NOTE:



- SPECIMEN SIZES SHALL BE COORDINATED WITH THE WELD PROCEDURE USED AND THE TESTING AGENCY TO MEET THE REQUIREMENTS FOR CERTIFICATION FOR SIZES $\frac{1}{2}$ " - 12" INCLUSIVE.

 Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	BUTT WELD & FILLET WELD COUPON LOCATIONS			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6			FIGURE: <div style="text-align: center; font-size: 24pt; font-weight: bold;">1101</div>
	5			
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NOTES:

1. WELD REINFORCEMENT SHALL BE REMOVED FROM BOTH FACES FLUSH WITH THE SURFACE OF THE SPECIMEN.
2. SPECIMEN SHALL NOT BE FLATTENED PRIOR TO TESTING.
3. ALL COUPONS SHALL BE PREPARED IN ACCORDANCE WITH API 1104 20th EDITION OCTOBER 2005, INCLUDING ERRATA/ADDENDUM (JULY 2007) AND ERRATA 2 (2008).
4. TENSILE COUPON WELD REINFORCEMENT SHALL NOT BE REMOVED.

 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	ROOT BEND TEST SPECIMEN			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6			FIGURE: 1102
	5			
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1107 WELDING PROCEDURE TEST REPORT

STANDARD PROCEDURE SPECIFICATION

- A) Process _____
- B) Material _____
- C) Diameter & Wall Thickness _____
- D) Joint Design _____
- E) Filler Metal & Number of Beads _____
- F) Electrical or Flame Characteristics _____
- G) Position _____
- H) Direction of Welding _____
- I) Number of Welders _____
- J) Time Lapse Between Passes _____
- K) Type of Line Up Clamp _____
- L) Removal of Line Up Clamp _____
- M) Cleaning _____
- N) Preheat _____
- O) Stress Relief _____
- P) Shielding Gas & Flow Rate _____
- Q) Shielding Flux _____
- R) Speed of Travel _____
- S) Sketches & Tabulations (to be attached) _____

Tested By: _____

Welder: _____

Approved: _____

Inspector: _____

Adopted: _____

RCES Gas Engineer: _____

1108 WELDER AND/OR PROCEDURE QUALIFICATION REPORT

WELDER AND/OR PROCEDURE QUALIFICATION REPORT

TEST No. _____

LOCATION _____ DATE _____
 CONTRACTOR _____ SUBCONTRACTOR _____
 SCHEDULE _____ GANG _____ INSPECTOR _____
 STATE _____ ROLL WELD _____ FIXED POSITION WELD _____
 WELDER _____ MARK _____
 WELDING TIME _____ TIME OF DAY ____ M TEMP. _____
 WEATHER CONDITIONS _____
 WIND BREAK USED _____ VOLTAGE _____ AMPERAGE _____
 TYPE OF WELDING MACHINE _____ SIZE _____
 FILLER METAL _____
 SIZE OF REINFORCEMENT _____
 PIPE MFG _____ KIND/TYPE _____
 WALL THICKNESS _____ O.D. _____ WT/FT _____ JOINT LENGTH _____

	1	2	3	4	5	6	7
BEAD SIZE _____							
SIZE OF ELECTRODE _____							
No. OF ELECTRODES _____							

COUPON STENCILED _____							
ORIG DIM OF PLATE _____							
ORIG PLATE AREA (IN ²) _____							
MAXIMUM LOAD _____							
TENSILE S/IN PLATE _____							
FRACTURE LOCATION _____							

_____ PROCEDURE _____ QUALIFYING TEST _____ QUALIFIED
 _____ WELDER _____ LINE TEST _____ DISQUALIFIED

MAX TENSILE _____ MIN TENSILE _____ AVG TENSILE _____
 REMARKS ON TENSILE _____

REMARKS ON BEND TESTS _____

REMARKS ON NICK TESTS _____

TESTS MADE AT _____ DATE _____
 TESTED BY _____ SUPERVISED BY _____
 APPROVED BY _____

1200 WELDING – MANUAL SHIELDED METAL ARC PROCESS

1201 SCOPE

This Standard establishes the requirements for the qualification of welding procedure, welder qualifications and field welding using the manual shield arc process for butt welded joints in pipe, valves, weld neck flanges and fittings and fillet welded joints in pipe branches, slip-on flanges, socket-weld fittings, etc. as applied to pipelines and connections to apparatus or equipment. This process is limited to butt weld pipe and fittings 2" NPS and larger, socket weld pipe and fittings 2-1/2" NPS and smaller, and branch connections 1/2" NPS and larger.

1202 GENERAL

The contents of this Standard conform to the requirements of the Minimum Federal Safety Standard (MFSS) Part 192 as promulgated by the United States Department of Transportation: American Petroleum Institute Standard 1104, editions as required by Part 192 and other provisions contained therein.

1202 QUALIFICATION OF WELDING PROCEDURE

A. Procedure

1. Process – the welding shall be by the manual shielded metal arc process.
2. Pipe and fitting material shall conform to:
 - a. Pipe - API Standard 5L, API Standard 5LX, Grades X42, ASTM A53 or ASTM A106.
 - b. Flanges and Fittings – ASTM A234, ASTM A181, ASTM A105 ANSI B16.5, ANSI 16.11 or MSS SP63.
 - c. This procedure shall also apply to materials with chemical and mechanical properties which comply with the foregoing, even though they are not manufactured in conformance with them.

3. Diameter Group – Wall Thickness Combination

- a. This procedure shall apply to butt welds and fillet welds of pipe, flanges, and fittings in the following groups:

Nominal Size (NPS)	Wall Thickness
2"	0.154" - 0.188"
3"	0.188" - 0.216"
4"	0.188" - 0.237"
6"	0.188" - 0.280"
8"	0.188" - 0.322"
10"	0.219" - 0.365"
12"	0.219" - 0.375"

4. Joint Design

All joints shall conform to requirements of Standard 1300.

5. Filler Metal

- a. The size and classification number of the filler metal and the minimum number and sequence of beads to be used with pipe of different wall thicknesses shall conform to the requirements of Standard 1300.
- b. The electrodes shall be free of rust and any foreign material that may be detrimental to the weld and within the moisture content range recommended by the electrode manufacturer.

6. Tack Weld

Where 50 percent of the root bead cannot be completed in equal segments on opposite sides of the joint without repositioning the line-up clamps, tack welds shall be used as follows:

- a. Following proper alignment, joints shall be tack welded as shown in Standard 1300 so that the spacing and alignment can be maintained during the welding operation.
- b. Tack welds shall be a maximum of three times the pipe wall thickness in length and two-thirds of the pipe wall thickness in depth at the center of the tack.
- c. The tack weld shall slope from its center to the bottom of the "V" groove at either end so that it may be properly fused into the root pass.

- d. Movement of the tack weld is prohibited. Tack welds that are twisted or opened to obtain root space shall be ground out before installing the root pass.

7. Electrical Characteristics

The welding current shall be direct current with reverse polarity (pipe negative and electrode positives). The voltage and amperage for each size electrode shall be as shown in Standard 1300.

8. Position

a. Butt Weld

The axis of the pipe to be welded shall be in a fixed horizontal position.

b. Fillet Weld

- i. Reduced Branch Connection – The axis of the header pipe shall be in a fixed horizontal position and the branch pipe axis shall extend vertically upward from the header.
- ii. Full Size Branch Connection – The axis of the header pipe shall be in a fixed horizontal position and the branch pipe axis shall extend vertically downward from the header.

- c. The pipe for all tests shall remain in the fixed position until all of the welds are completed and cooled to a temperature of 200 degrees F or lower.

9. Direction of Welding

- a. Welding by the downhill method, starting at the top center of the pipe and stopping at the bottom center of the root pass. Starts and stops on subsequent passes shall be staggered so that no two beads start or stop at the same location.
- b. Welding by the uphill method will be acceptable providing the procedure is qualified in accordance with Minimum Federal Safety Standard (MFSS) Part 192 requirements.
- c. Regardless of the direction of the welding qualified in the process qualification, a change in the direction of welding will require a requalification of the process and the welder.

10. Number of Welders

Each shall pipe joint regardless of size shall be welded by only one welder.

11. Time Lapse Between Passes

The maximum time interval between the completion of the root bead and the beginning of the first filler bead shall be five (5) minutes.

12. Type of Lie-Up Clamps

- a. Butt Welded Joints
 - i. Internal line-up clamps may be used on 10" and 12" pipe.
 - ii. External line-up clamps shall be used when it is not possible to use internal clamps; however, external clamps may be used on all pipe sizes.

13. Removal of Line-Up Clamps

- a. Where internal line-up clamps are used, they shall be held in place until the root bead has been completed.
- b. Where external line-up clamps are used, they shall be held in place at least 50% of the circumference is welded in increments of equal length spaced equally around the circumference of the pipe.
- c. The entire root bead shall be made with the pipe in a stationary position. Movement of the pipe during welding of the root bead shall be avoided.

14. Cleaning

- a. Surfaces for welding shall be cleaned of all rust, scale, primer, oil or other materials that may be detrimental to the finished weld.
- b. All slag, knots of filler material, pinholes and similar surface defects shall be removed with a power grinder or diamond point round-nose chisel before depositing the next pass.

15. Preheat – Not Required

16. Shielding Flux

Cellulose sodium coated electrodes shall be used.

17. Speed of Travel

Welding shall be performed at the rate of two to three inches per minute with continuous application of each pass.

18. Test Joints

Preparation and welding of test joints, type and number of specimens, removal of test specimens and test results shall conform to API Standard 1104 20th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008).

1204 WELDER QUALIFICATION

A. General

1. The qualification test welds made by each welder shall be conducted in the presence of the qualified observer approved by the RCES Gas Engineer.
2. The actual examination of the welds may be made wherever proper testing facilities and personnel qualified to make an examination are available.
3. Material and methods used for welder qualifications shall conform to those in "Qualification of Welding Procedure", Section 1203 of this Standard.

B. Qualification Tests

To qualify under this Standard a welder shall successfully complete the following tests:

1. Multiple Qualification

a. Butt Weld

The welder shall make a butt weld joining two pieces of pipe of the following diameter group-wall thickness group combinations with the pipe in the fixed horizontal (5G) position.

42 1/2" NPS (12-3/4" O.D.) x 0.250" w.t. or 0.375" w.t.

The wall thickness selected shall match that of the line pipe selected for the project for which the welder is qualifying.

¹The pipe specimen sizes shall be coordinated with the weld procedure used and the testing agency to meet the requirements for certification for pipe sizes 1/2" – 12", inclusive.

b. Fillet Weld

- i. Full Size Branch – The welder shall make a fillet weld joining two pieces of pipe of the following wall thickness groups with the axis of the header pipe in the fixed horizontal position and the branch pipe axis extended vertically downward from the header (4F).

42 1/2" NPS (12-3/4" O.D.) x 0.250" w.t. or 0.375" w.t.

The wall thickness selected shall match that of the line pipe selected for the project for which the welder is qualifying.

¹The pipe specimen sizes shall be coordinated with the weld procedure used and the testing agency to meet the requirements for certification for pipe sizes ½” – 12”, inclusive.

- ii. Small Branch – The welder shall make a fillet weld joining ½” or ¾” service tee with its axis extending vertically upward from a 2” NPS header which has its axis in the fixed horizontal position (2F).
 - c. A welder who has successfully completed test required this Section shall be considered qualified to weld in all positions, on all wall thicknesses, joint designs, fittings and on all pipe diameters.
2. Weld test specimen numbers, location and preparation shall conform to Section 1206 of this Standard using the appropriate pipe size as a guide.

3. Tensile Test Requirements – Butt Welds

If any of the tensile test specimens break in the weld or at the junction of the weld and the base metal the welder shall be disqualified. In addition the qualification standards of API Standard 1104 0th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008) shall be the minimum criteria for acceptance.

4. Nick Break Test Requirements – Butt Welds

The welder shall be disqualified if any one specimen fails to pass the minimum acceptable criteria of API Standard 1104 20th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008).

5. Root and Face Bend Test Requirements – Butt Welds

The welder shall be disqualified if any one specimen fails to pass the minimum acceptable criteria of API Standard 1104 20th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008). However, if in the opinion of the qualified welding inspector, the lack of penetration occurring is not representative of the weld; the test specimen may be replaced by an additional specimen cut adjacent to the one that failed.

6. Nick Break Test Requirements – Full Size Branch Fillet Weld

- a. Tests and minimum acceptance criteria shall conform to the requirements of API Standard 1104 20th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008).
- b. Additionally, the branch connection shall be capable of resisting being broken off the header using any available means.

- c. The welder shall be disqualified if any one specimen shows defects exceeding the cited standard.

7. Small Branch Test Requirements – Fillet Weld

- a. Visual inspection shall determine the weld to be free of serious undercutting and rolled edges.
- b. The branch connection shall be capable of resisting being broken off the header using any available means.
- c. The welder shall be disqualified if in the opinion of the qualified welding inspector the welding specimen fails either the visual inspection or the break requirements of this Section.

C. Initial Qualification

The welder qualification tests shall be successfully completed by each welder employed by the RCES Gas Department or by a contractor doing work for the RCES Gas Department for work on any portion or component of any main, pipeline, service lateral, meter-regulator installation, regulator station, pressure vessel, etc. which are part of the distribution systems of the RCES Gas Department.

D. Failure to Pass Qualification Tests

1. Failure to pass any given test shall disqualify the welder failing the test from performing this type of welding on any portion or component used in the system until the welder repeats and successfully passes the test which he had previously failed.
2. The failed test may be repeated immediately if in the opinion of a qualified welding inspector and/or the RCES Gas Engineer, failure of a welder to pass the test was due to conditions beyond his control.
3. Failure for any other reason shall require the welder to submit proof of subsequent welder training acceptable to the RCES Gas Engineer and the qualified welding inspector before the failed test may be repeated.

E. Duration of Qualification

1. The welder's qualification, subject to the limitations of the following provisions of this Section shall remain in effect for a period of six (6) months following his acceptable qualification test.
2. All welders shall possess a valid certification not more than six (6) months old. Their certificate must be valid through the duration of any project on which they perform welding procedures. The certificate must be valid in all welding processes as required by the multiple qualification tests.

3. If, in the process of one continuous gas line construction project, a welder's six (6) month certification expires, his certificate may be validated for one (1) additional six (6) month period by removing production pipeline welds and having them destructively tested. These welds shall be picked at random by the RCES Inspector and tested to the same standards as the routine qualification tests. If the field welds fail, the welder shall be required to re-take the welder multiple qualifications test and successfully pass them before being permitted to weld on the project. Validation certification shall be performed in accordance with the Field Check provisions of this Section. One and only one field recertification may be made by this validation process. The validation is in force only through the conclusion of the project on which the validation by field check occurred.
4. A welder who has not been engaged in welding on the RCID Gas system in a given process for a period of six (6) months or more shall be disqualified in that process. He shall be permitted to repeat the multiple certification qualification test immediately.
5. If, in the opinion of the RCES Inspector, RCES Gas Engineer, RCES Gas Utility Services Manager or the qualified welding inspector, there is a specific reason to question the welder's ability, the welder shall be required to repeat the multiple certification qualification test.

F. Field Check

1. A field check may be performed of the field or production welds, selected at random by the RCES Inspector, at any time.
2. Welds shall be checked by one of the following methods:
 - a. Destructive (coupon) Test
 - i. Weld selected shall be a butt weld made with pipe in the fixed horizontal position.
 - ii. A cylindrical section, 12" long, with the weld at mid-span, shall be removed from the pipe being installed in the presence of the RCES Gas Inspector.
 - iii. Location and number of test specimens shall be the same as for the initial qualification test.
 - b. Non-destructive testing may be required.
 - c. Trepanning is prohibited.
3. Failure to Pass Field Check

- a. When a weld fails the field crack using the destructive test specified in this Section in a given welding process, a second field weld produced by the same process shall be tested immediately.
- b. If the second weld also fails the field check, the welder shall be disqualified and prohibited from welding on any RCES Gas Department work using that welding process used in the failed field check tests. The disqualification shall remain in effect until the welder requalifies by multiple certification test.

1205 FIELD WELDING

A. General

Welding materials and procedures shall conform to those used in the Qualification of Welding Procedure, Section 1203 of this Standard.

B. Equipment

1. Welding equipment shall be of a size and type suitable for the work and shall be maintained in such condition as to provide acceptable welds, continuity of operation and safety of personnel.
2. Each welding unit shall have an approved fire extinguisher in good operating condition.
3. Each welding unit shall be equipped with a grinder and buffering machine suitable for preparing pipe joints.
4. Any equipment failing to meet these requirements shall be repaired or replaced upon request of the RCES Inspector.

C. Preparation of Welding Edges

1. The edges or surfaces of parts to be joined by welding shall be prepared by machining, grinding, flame-cutting or filing.
2. Edges prepared by flame-cutting shall be dressed with a file or grinder to produce a smooth uniform surface before welding.
3. The welder shall cut and bevel parts to be welded to conform to the dimensions given in 1300 of this Standard.
 4. All field bevels on 3" NPS and larger nominal diameter shall be performed with a beveling machine.

5. Cleaning

- a. The welding surfaces shall be free from rust, scale, primer, oil, or other foreign matter. The parts to be welded shall be free from oily or greasy matter at least 2" from the welding edge or surface.
- b. The weld shall be protected from impairment due to prevailing weather conditions such as airborne moisture, blowing sand, high winds, etc.
- c. After each weld bead the joint shall be cleaned of all slag prior to application of the subsequent bead.

D. Mitered Joints

1. A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of 10 percent or less of SMYS may not deflect the pipe more than 15 degrees.
2. Miter joints are not permitted on pipes that operate at a hoop stress of 10 percent or more of SMYS.
3. Sectioned standard fittings shall be used in lieu of miters for offsets of more than 15 degrees.

E. Welding Technique

1. The size and classification number of the electrode and the minimum number and sequence of beads to be used with pipe of different wall thicknesses shall conform to the requirements of Standard 1300.
2. Roll welding will be permitted provided alignment is maintained by use of structural framework.

F. Clearance

1. Pipe welded above ground shall be provided with a working clearance at the weld not less than 16".
2. Pipe welded in the trench requires a bell hole of sufficient size to provide the welder with ready access to the joint.

G. Longitudinal Pipe Welds

1. Each length of pipe shall be installed so that the longitudinal weld of abutting lengths is in the upper quadrant (within 45 degrees above the vertical centerline).
2. Abutting pipe lengths shall be linked up so that the longitudinal welds are staggered at least 20 degrees.

3. Hammering of the pipe to obtain proper line-up shall be held to a minimum.

H. Ground Cable

1. Ground cables shall be attached to the pipe by means of clips made up of pipe or other suitable material.
2. Welding of ground cables to the pipe is not allowed.
3. Ground cables shall have a good electrical connection to the pipe to prevent arching. Grounds shall normally be attached to pipe within 40 feet of the point of welding.

I. Finished Welds

1. The finished welds shall be of sound metal thoroughly fused to the base metal.
2. Butt Welds

The crown surface shall be built up over the pipe wall surface so there are at least 1/32" of reinforcement and an overlap of 1/16" on either side of the original bevel groove, but not more than 3/32". No grinding of field welds are required unless ordered by the RCES Gas Engineer or by contract documents.

3. Fillet Welds

The weld shall be level or concave. Convex welds are not permitted. There shall be no undercutting along the edges of the weld.

J. Defects

1. Defects, except cracks in the root and filler beads, shall be repaired by welding.
2. Before repairs are made, injurious defects shall be entirely removed to clean metal. All slag and scale shall be removed by wire brushing.

K. Unequal Wall Thickness Combinations

Where the wall thickness of adjoining ends vary by more than 3/32" or the nominal external offset exceeds ½ the thinner wall, the end of the larger shall be tapered to the accepted re-entrant angle to conform to Standard 1300.

L. Qualification Records

The RCES Engineering and the RCES Gas Department shall maintain a record of all Welder Qualification Tests showing the date and result of tests. This data will be shown on the forms in Section 1207 and/or 1208 or an equivalent approved form.

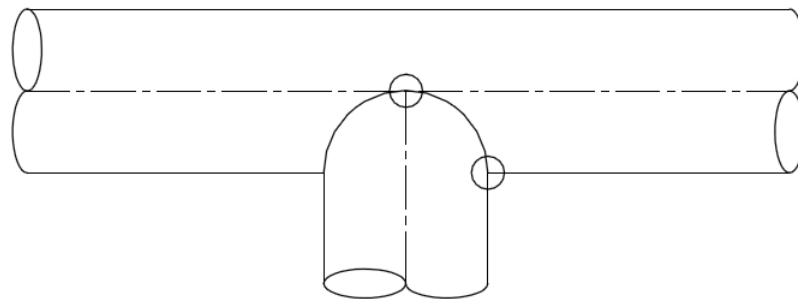
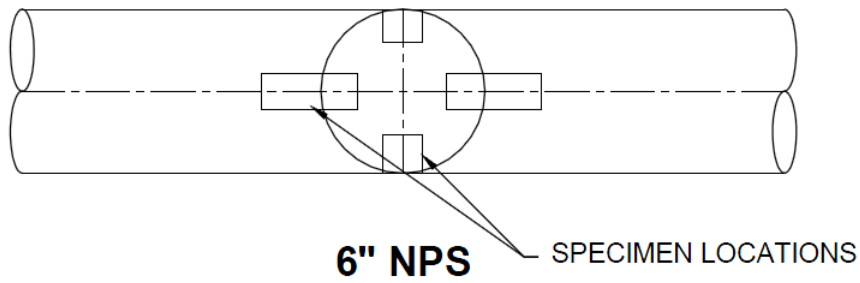
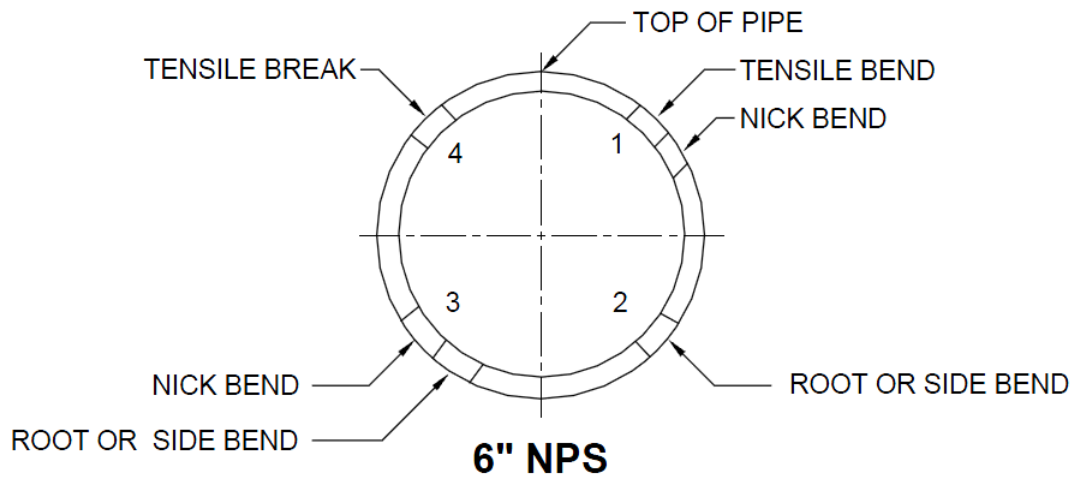
1206 TEST SPECIMENS

A. Location of the Test Specimens

1. Butt Weld – See Detail 1201.
2. Fillet Weld – See Detail 1201.



B. Preparation of Test Specimens

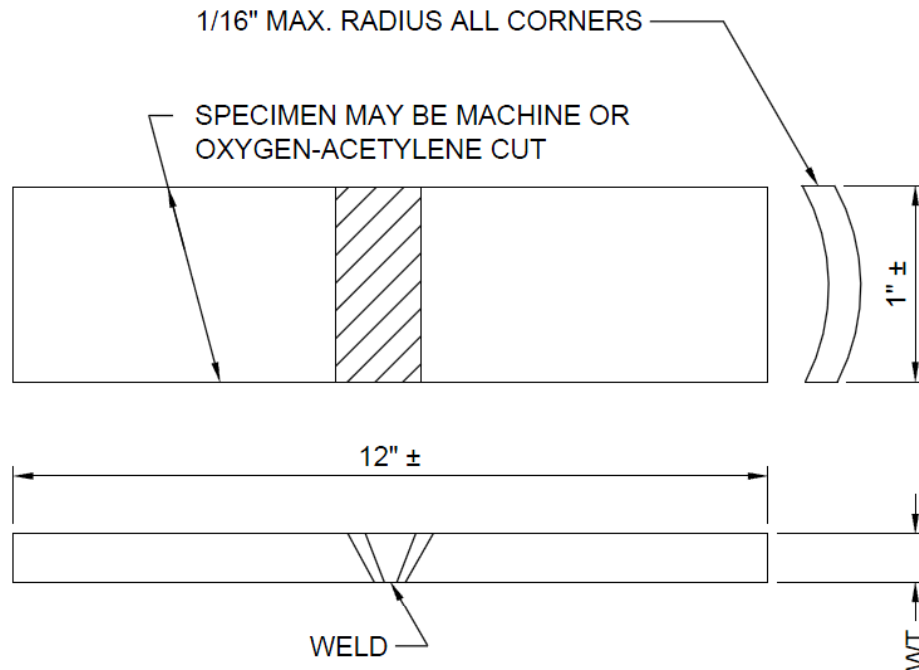
1. Root Bent Test Specimen – See Detail 1202.



NOTE:



1. SPECIMEN SIZES SHALL BE COORDINATED WITH THE WELD PROCEDURE USED AND THE TESTING AGENCY TO MEET THE REQUIREMENTS FOR CERTIFICATION FOR SIZES $\frac{1}{2}$ " - 12" INCLUSIVE.

 ACES <small>REEDY CREEK ENERGY SERVICES</small> Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	BUTT WELD & FILLET WELD COUPON LOCATIONS			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6			FIGURE: 1201
	5			
	4	BLT	6/1/2016	
ISSUE	APPR	DATE	ISSUED FOR	



NOTES:

1. WELD REINFORCEMENT SHALL BE REMOVED FROM BOTH FACES FLUSH WITH THE SURFACE OF THE SPECIMEN.
2. SPECIMEN SHALL NOT BE FLATTENED PRIOR TO TESTING.
3. ALL COUPONS SHALL BE PREPARED IN ACCORDANCE WITH API 1104 20th EDITION OCTOBER 2005, INCLUDING ERRATA/ADDENDUM (JULY 2007) AND ERRATA 2 (2008).
4. TENSILE COUPON WELD REINFORCEMENT SHALL NOT BE REMOVED.

 ACES <small>REEDY CREEK ENERGY SERVICES</small> Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	ROOT BEND TEST SPECIMEN				DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6				FIGURE: 1202
	5				
	4	BLT	6/1/2016	GAS MANUAL UPDATE	
<small>ISSUE</small>	<small>APPR</small>	<small>DATE</small>	<small>ISSUED FOR</small>		

1207 WELDING PROCEDURE TEST REPORT

STANDARD PROCEDURE SPECIFICATION

- A) Process _____
- B) Material _____
- C) Diameter & Wall Thickness _____
- D) Joint Design _____
- E) Filler Metal & Number of Beads _____
- F) Electrical or Flame Characteristics _____
- G) Position _____
- H) Direction of Welding _____
- I) Number of Welders _____
- J) Time Lapse Between Passes _____
- K) Type of Line Up Clamp _____
- L) Removal of Line Up Clamp _____
- M) Cleaning _____
- N) Preheat _____
- O) Stress Relief _____
- P) Shielding Gas & Flow Rate _____
- Q) Shielding Flux _____
- R) Speed of Travel _____
- S) Sketches & Tabulations (to be attached) _____

Tested By: _____

Welder: _____

Approved: _____

Inspector: _____

Adopted: _____

RCES Gas Engineer: _____

1208 WELDER AND/OR PROCEDURE QUALIFICATION REPORT

WELDER AND/OR PROCEDURE QUALIFICATION REPORT

TEST No. _____

LOCATION _____ DATE _____
 CONTRACTOR _____ SUBCONTRACTOR _____
 SCHEDULE _____ GANG _____ INSPECTOR _____
 STATE _____ ROLL WELD _____ FIXED POSITION WELD _____
 WELDER _____ MARK _____
 WELDING TIME _____ TIME OF DAY ____ M TEMP. _____
 WEATHER CONDITIONS _____
 WIND BREAK USED _____ VOLTAGE _____ AMPERAGE _____
 TYPE OF WELDING MACHINE _____ SIZE _____
 FILLER METAL _____
 SIZE OF REINFORCEMENT _____
 PIPE MFG _____ KIND/TYPE _____
 WALL THICKNESS _____ O.D. _____ WT/FT _____ JOINT LENGTH _____

	1	2	3	4	5	6	7
BEAD SIZE _____							
SIZE OF ELECTRODE _____							
No. OF ELECTRODES _____							
COUPON STENCILED _____							
ORIG DIM OF PLATE _____							
ORIG PLATE AREA (IN ²) _____							
MAXIMUM LOAD _____							
TENSILE S/IN PLATE _____							
FRACTURE LOCATION _____							

_____ PROCEDURE _____ QUALIFYING TEST _____ QUALIFIED
 _____ WELDER _____ LINE TEST _____ DISQUALIFIED

MAX TENSILE _____ MIN TENSILE _____ AVG TENSILE _____
 REMARKS ON TENSILE _____

REMARKS ON BEND TESTS _____

REMARKS ON NICK TESTS _____

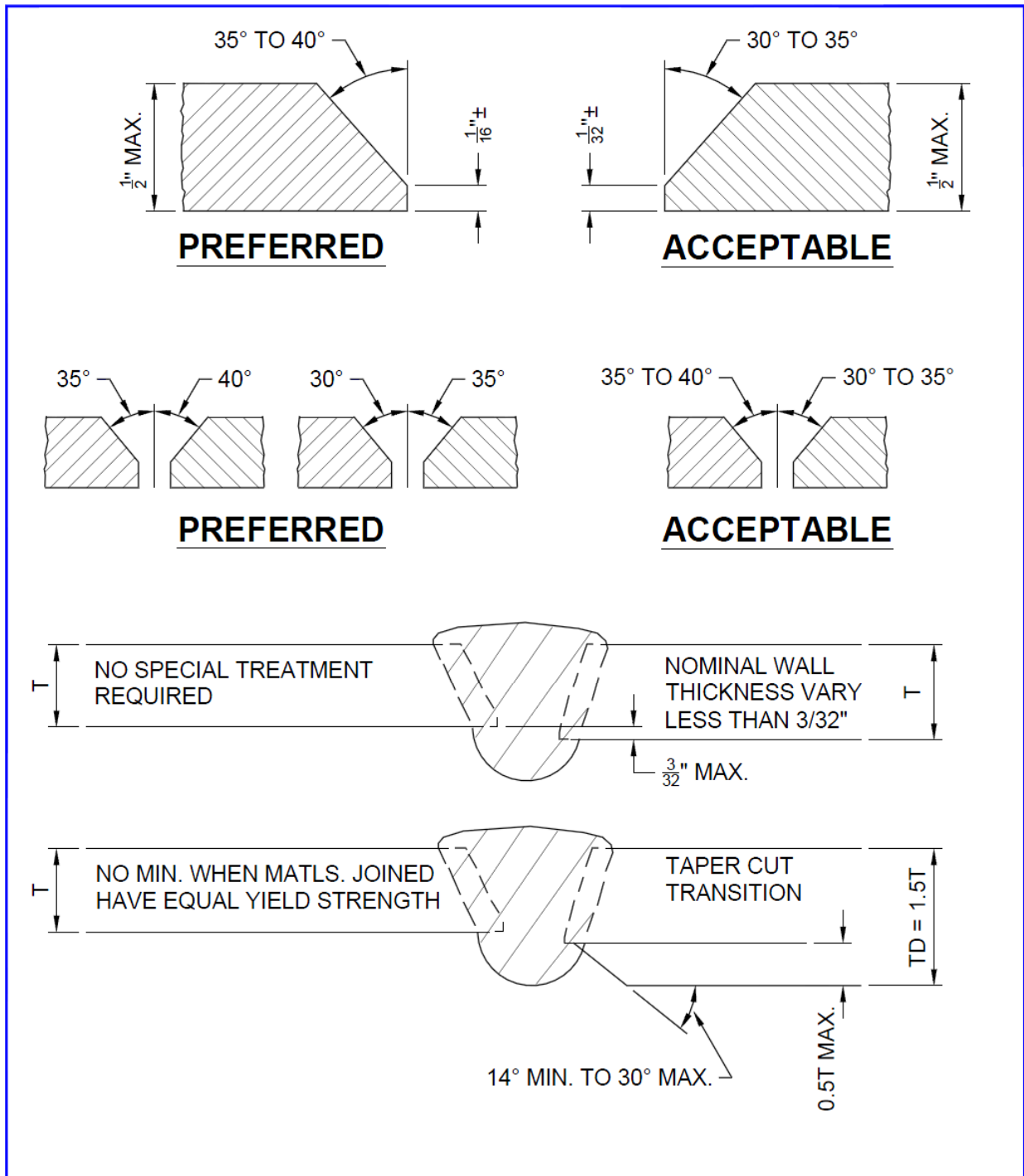
TESTS MADE AT _____ DATE _____
 TESTED BY _____ SUPERVISED BY _____
 APPROVED BY _____



1300 WELDING – WELDING TECHNIQUE – ALL POSITIONS OXY- ACETYLENE, SHIELDED METAL ARC, GAS METAL ARC

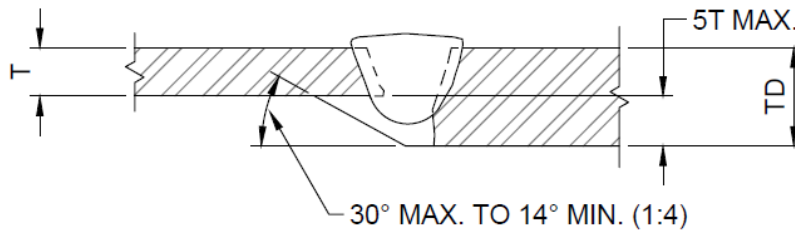
1301 BUTT WELD JOINT DESIGN

- A. Standard end preparation of pipe and butt weld fittings – See Detail 1301.
- B. Acceptable combinations of pipe end preparations – See Detail 1301.
- C. Unequal Thickness of Butt Weld sections
 - 1. Nominal wall thicknesses vary less than 3/32” – No special treatment is necessary – See Detail 1301.
 - 2. Nominal internal offset is greater than 3/32” or greater than half of the thinner section.
 - a. Taper Cut Transition – See Detail 1301.
 - b. Combination taper cut/taper weld transition – See Detail 1302.
 - 3. Nominal internal offset greater than 3/32” but less than half of the thinner section – See Detail 1303.

This condition requires access to the inside of the pipe to address it properly. If access is not possible, correct by the combination taper cut/taper weld method of 1301.C.2.b.
 - 4. External offset less than half of the thinner section – See Detail 1304.
 - 5. External offset greater than half of the thinner section – See Detail 1304.
 - 6. Internal and external offset – See Detail 1304.



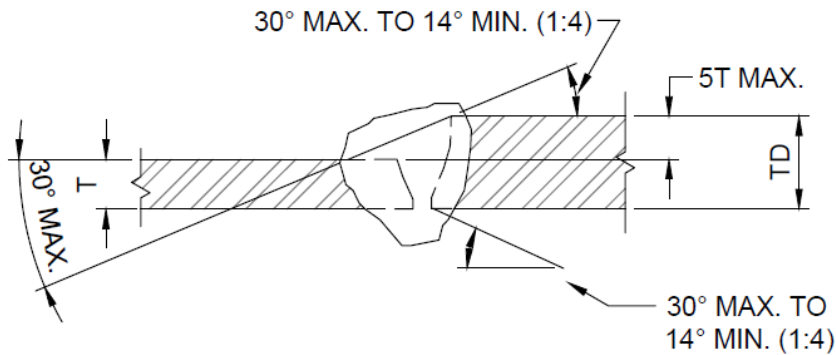
 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	STANDARD END PREPARATIONS OF PIPE AND BUTT WELD FITTINGS				DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6				FIGURE: 1301
	5				
	4	BLT	6/1/2016	GAS MANUAL UPDATE	
	ISSUE	APPR	DATE	ISSUED FOR	



NOTE:

1. NO MINIMUM WHEN MATERIALS JOINED HAVE EQUAL YIELD STRENGTH



COMBINATION TAPER CUT- TAPER WELD TRANSITION

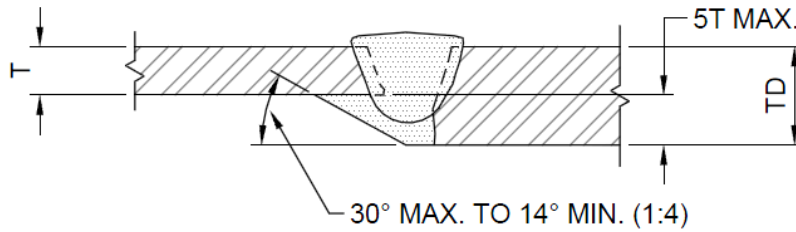


NOTE:

1. NO MINIMUM WHEN MATERIALS JOINED HAVE EQUAL YIELD STRENGTH

INTERNAL AND EXTERNAL OFFSET



 Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	UNEQUAL THICKNESS OF BUTT WELD SECTIONS			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6			FIGURE: 1302
	5			
	4	BLT	6/1/2016	
	ISSUE	APPR	DATE	ISSUED FOR

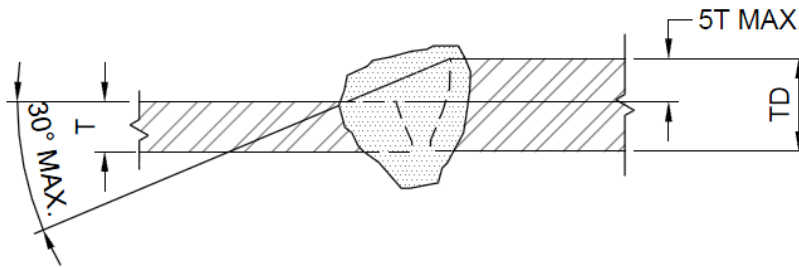


NOTE:

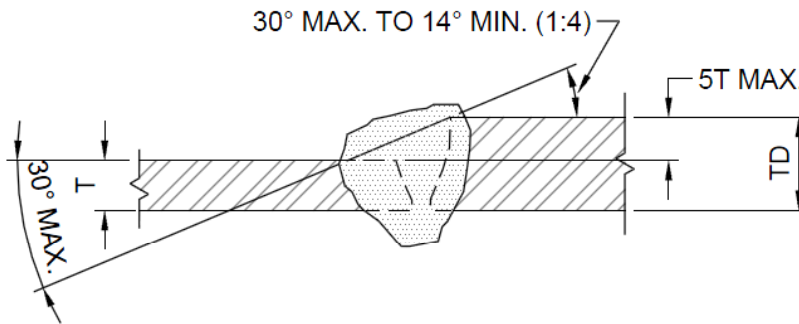
1. REQUIRES ACCESS TO INSIDE OF PIPE. IF NO ACCESS USE METHOD SHOWN IN THE COMBINATION TAPER CUT - TAPER WELD TRANSITION.

NOMINAL INTERNAL OFFSET
GREATER THAN 3/32" BUT LESS THAN 1/2 THE
THINNER SECTION

 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	UNEQUAL THICKNESS OF BUTT WELD SECTIONS				DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
	6				FIGURE: <p align="center">1303</p>
	5				
	4	BLT	6/1/2016	GAS MANUAL UPDATE	
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**EXTERNAL OFFSET
 LESS THAN 1/2 THE THINNER SECTION**



NOTE:

1. NO MINIMUM WHEN MATERIALS JOINED HAVE EQUAL YIELD STRENGTH

**EXTERNAL OFFSET
 GREATER THAN 1/2 THE THINNER SECTION**



Mechanical Engineering Department
 (407) 824-4943, P.O. BOX 10000,
 Lake Buena Vista Florida 32830-1000
 Certificate of Authorization No. 27841

**UNEQUAL THICKNESS OF
 BUTT WELD SECTIONS**

6			
5			
4	BLT	6/1/2016	GAS MANUAL UPDATE
ISSUE	APPR	DATE	ISSUED FOR

DESIGNED FOR:



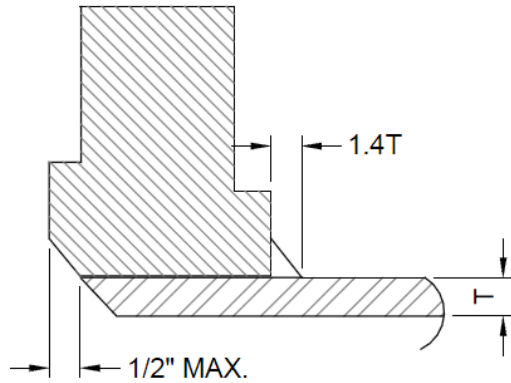
REEDY CREEK
 IMPROVEMENT DISTRICT

FIGURE:

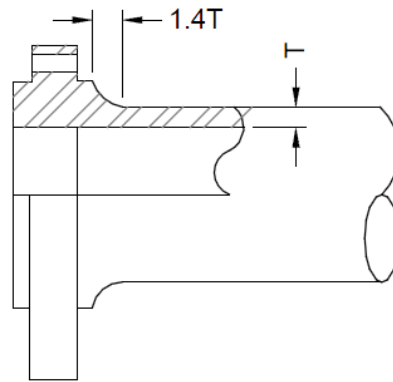
1304

1302 FILLET WELD JOINT DESIGN

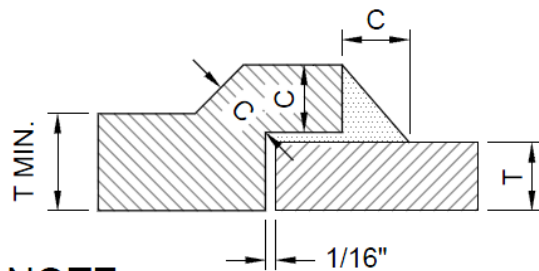
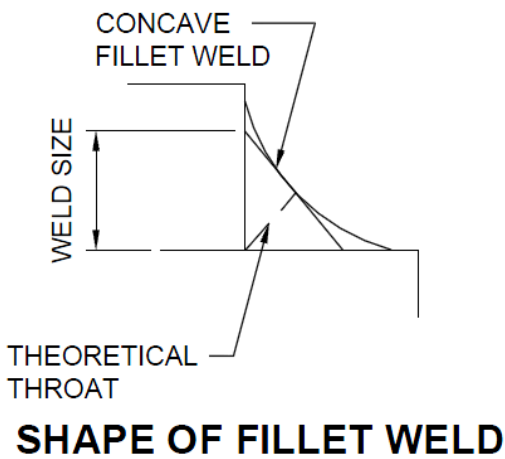
- A. Flanges, slip-on and socket weld – See Detail 1305.
- B. Socket weld only – See Detail 1305.
- C. Shape of fillet weld – See Detail 1305.



SLIP-ON FLANGE
FRONT AND BACK WELD



SOCKET WELD FLANGE



NOTE:
 C MIN.= 1-1/4 T, BUT NOT LESS THAN 5/32"

SOCKET WELD ONLY



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FILLET WELD JOINT DESIGN

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FIGURE:

1305

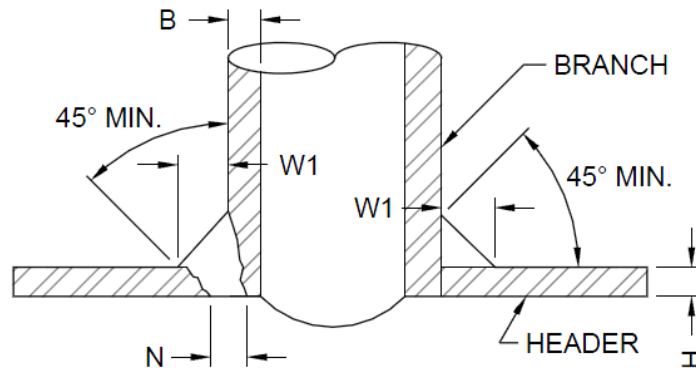
1303 BRANCH WELD JOINT DESIGN

- A. Without reinforcement other than header and branch wall – See Detail 1306.
- B. With localized reinforcement – See Detail 1306.

Note: If M dimension is thicker than H dimension, the reinforcing member shall be tapered down to the header wall thickness.

Note: Provide hole in reinforcement to reveal leakage in buried welds and to provide ventilation during welding and heat treatment.

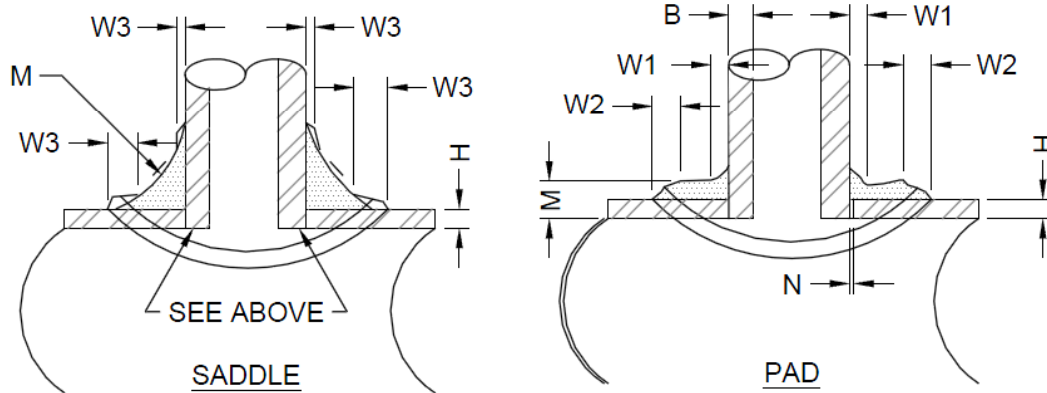
- C. With complete encirclement reinforcement – See Detail 1307.



NOTES:



1. WHEN A WELDING SADDLE IS USED IT SHALL BE INSERTED OVER THIS TYPE OF CONNECTION.
2. $W 1 = 3/8B$, BUT NOT LESS THAN $1/4"$, $N = 1/16"$ MIN., $1/8"$ MAX. UNLESS BACK-WELDED OR BACKING STRIP IS USED.

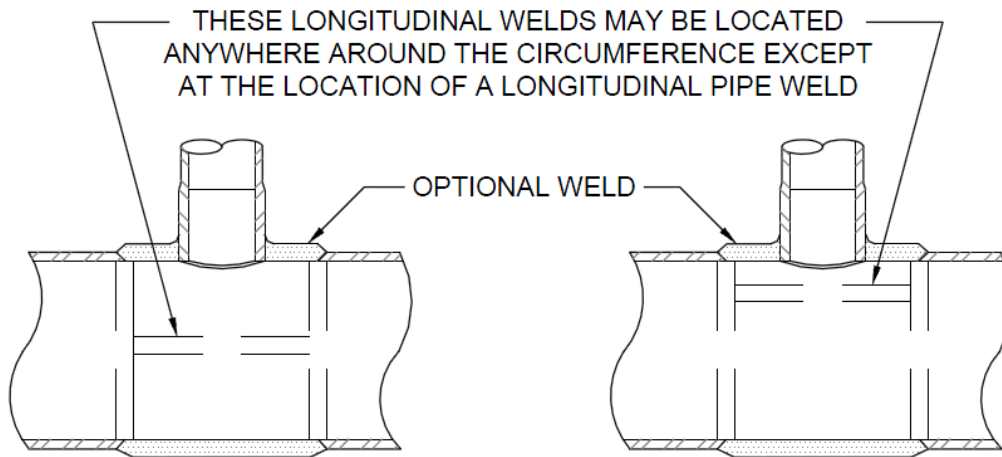
BRANCH WELD JOINT DESIGN



NOTES:

1. $W 1$ (MINIMUM) = $3/8 B$ BUT NOT LESS THAN $1/4"$
2. $W 2$ (MINIMUM) = $1/2 M$ BUT NOT LESS THAN $1/4"$
3. $W 3$ (MINIMUM) = M BUT NOT GREATER THAN H
4. $M=1/16"$ (MIN.), $1/8"$ (MAX.), UNLESS BACK WELDED OR BACKING STRIP IS USED.
5. ALL WELDS TO HAVE EQUAL LEG DIM. AND MIN. THROAT= $0.707 \times$ LEG DIMENSION.

 ACES REEDY CREEK ENERGY SERVICES Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	BRANCH WELD JOINT DESIGN			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT
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TEE TYPE

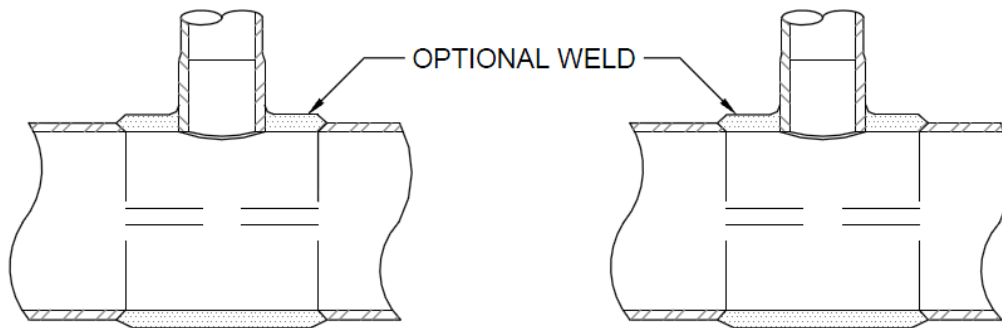
SLEEVE TYPE

NOTE:

SINCE FLUID PRESSURE IS EXERTED ON BOTH SIDES OF PIPE METAL UNDER TEE, THE PIPE METAL DOES NOT PROVIDE REINFORCEMENT

NOTE:

PROVIDE HOLE IN REINFORCEMENT TO REVEAL LEAKAGE IN BURIED WELDS AND TO PROVIDE VENTING DURING WELDING AND HEAT TREATMENT NOT REQUIRED FOR TEE TYPE.



SADDLE AND SLEEVE TYPE

SADDLE TYPE



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COMPLETE ENCIRCLEMENT JOINT DESIGN

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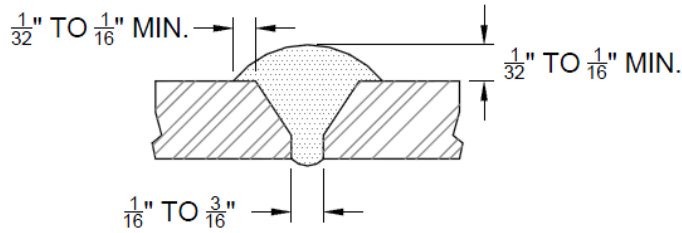
**REEDY CREEK
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FIGURE:

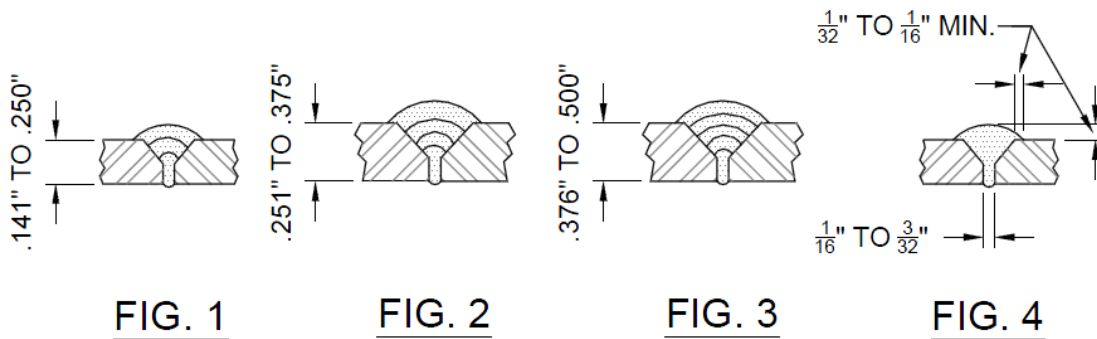
1307

1304 WELD CHARACTERISTICS

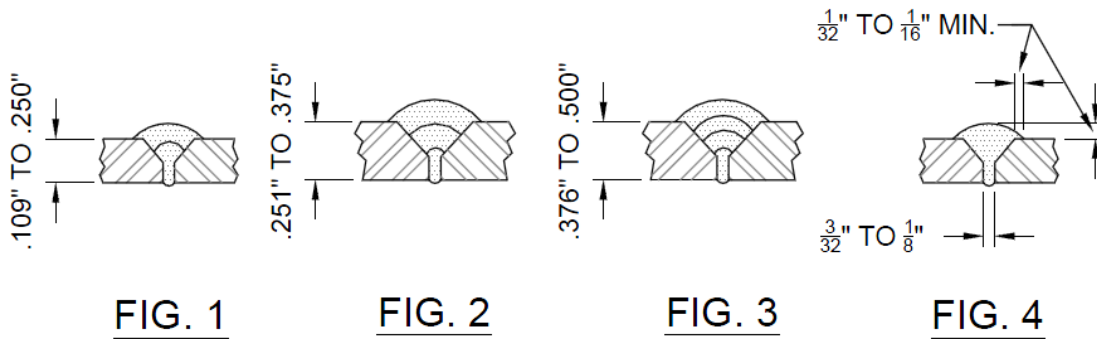
- A. Manual oxy-acetylene – See Detail 1308.
- B. Manual shielded metal arc – See Detail 1308.
- C. Semi-automatic gas metal arc – See Detail 1308.



MANUAL OXY-ACETYLENE



MANUAL SHIELDED METAL-ARC



SEMI-AUTOMATIC GAS METAL-ARC



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WELD CHARACTERISTICS

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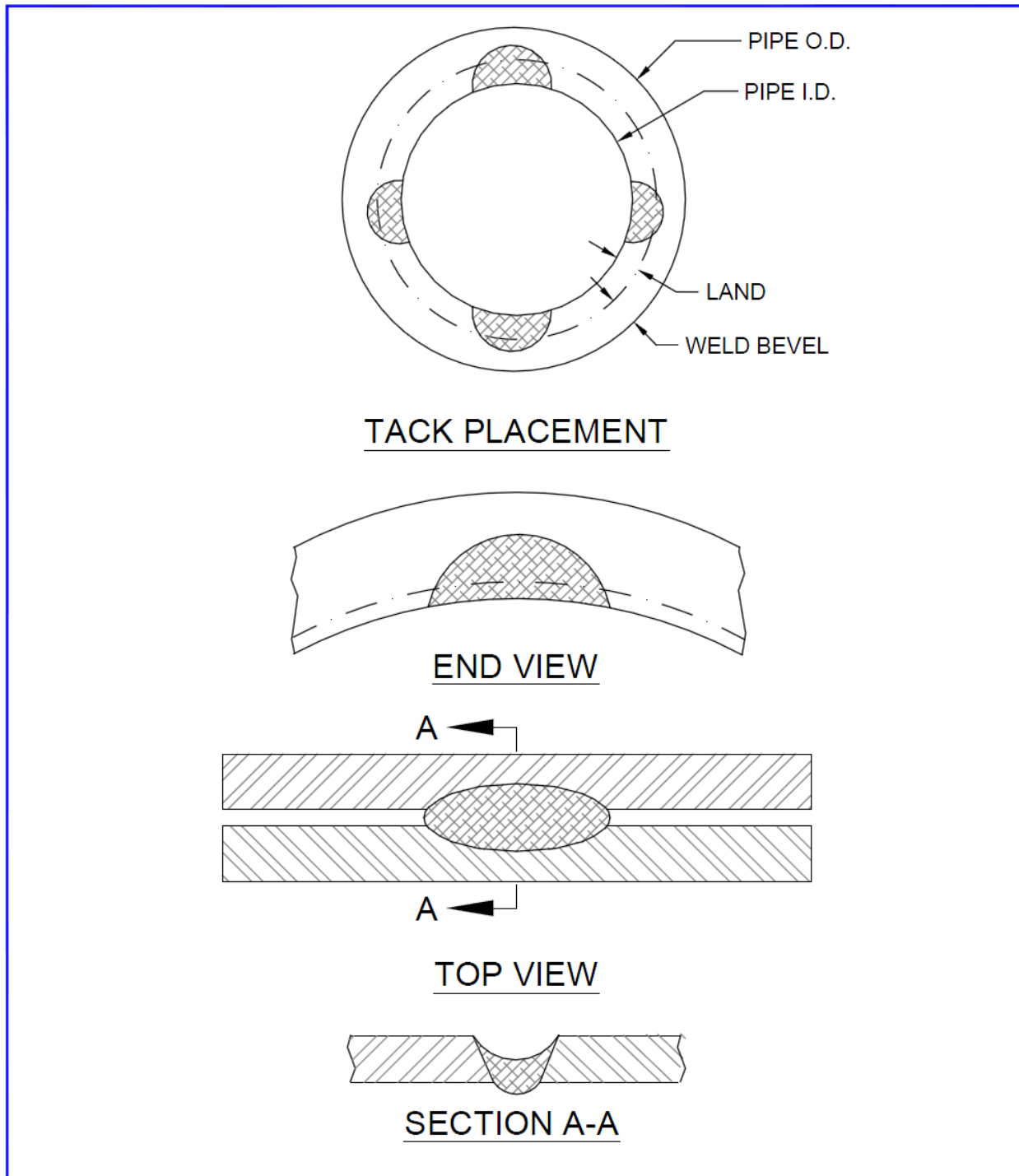
FIGURE:



1308

1305 TACK WELDS

A. Tack Placement – See Detail 1309.

B. Tack Detail – See Detail 1309.



 ACES <small>REEDY CREEK ENERGY SERVICES</small> Mechanical Engineering Department (407) 824-4943, P.O. BOX 10000, Lake Buena Vista Florida 32830-1000 Certificate of Authorization No. 27841	TACK WELDS			DESIGNED FOR:  REEDY CREEK IMPROVEMENT DISTRICT														
	<table border="1"> <tr> <td>6</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>BLT</td> <td>6/1/2016</td> <td>GAS MANUAL UPDATE</td> </tr> <tr> <td>ISSUE</td> <td>APPR</td> <td>DATE</td> <td>ISSUED FOR</td> </tr> </table>	6				5				4	BLT	6/1/2016	GAS MANUAL UPDATE	ISSUE	APPR	DATE	ISSUED FOR	FIGURE: <div style="text-align: center; font-size: 24pt; font-weight: bold;">1309</div>
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1306 FILLER METAL

A. Manual Oxy-acetylene

Pipe Wall Thickness	AWS No.	Rod	Size
0.109 to 0.125"	RG 60		3/32" or 1/8"
0.126 to 0.218"	RG 60		1/8" or 5/32"

B. Manual Shielded Metal Arc

Pipe Wall Thickness	Bead Type	AWS No.	Electrodes	Size	No. of Beads
0.141 to 0.188"	Root	E6010		1/8"	3
	Filler	E7010		1/8"	
	Cover	E7010		1/8" or 5/32"	
0.189 to 0.250"	Root	E6010		1/8" or 5/32"	3
	Filler	E7010		1/8" or 5/32"	
	Cover	E7010		5/32" or 3/16"	
0.251 to 0.375"	Root	E6010		1/8" or 5/32"	3 or 4
	Filler	E7010		1/8" or 5/32"	
	Cover	E7010		5/32" or 3/16"	
0.376 to 0.500"	Root	E6010		1/8" or 5/32"	4 or 5
	Filler	E7010		5/32"	
	Cover	E7010		5/32" or 3/16"	

C. Semi-automatic Gas Metal Arc

Pipe Wall Thickness	Bead Type	Electrodes		No. of Beads
		AWS No.	Size	
0.109 to 0.141"	All	E70S-G	0.025" or 0.030"	2
0.142 to 0.250"	All	E70S-G	0.035"	2 or 3
0.251 to 0.375"	All	E70S-G	0.035"	3 or 4
0.376 to 0.500"	All	E70S-G	0.035"	4 or 5

1307 FLAME CHARACTERISTICS FOR OXY-ACETYLENE PROCESSES

The flame shall be adjusted to the near neutral condition with a slight excess amount of acetylene to assure the absence of an oxidizing flame which adversely influences the weld quality.

1308 ELECTRICAL REQUIREMENTS FOR WELDING PROCESSES

A. Manual Shielded Metal Arc

Electrode Size	Amperes	Minimum Voltage
3/32"	60-80	20
1/8"	80-120	22
5/32"	120-200	25
3/16"	150-200	28

B. Semi-automatic Gas Metal Arc

Wire Diameter	Amperes	Minimum Voltage
0.025 or 0.030"	90-170	18-26
0.035"	90-170	18-26

1309 REPAIR OR REMOVAL OF DEFECTS

- A. Each weld that is unacceptable under MFSS Section 192.241.c must be removed or repaired. A weld must be removed if it has a crack that is more than 2 inches long or that penetrates either the root or second bead or does not meet the radiographic and/or other NDT standard requirements of API Standard 1104 20th edition October 2005, including errata/addendum (July 2007) and errata 2 (2008).
- B. Each weld that is repaired must have the defect removed down to clean metal and the segment to be repaired must be preheated. After repair, the segment of the weld that was repaired must be inspected to verify its acceptability. If the repair is not acceptable, the weld must be removed.
- C. Each imperfection or damage, including arc burns, that impairs the serviceability of a length of steel pipe must be repaired or removed. If a repair is made by grinding, the arc burn must be completely removed and the remaining wall thickness must be at least equal to either:
 - 1. The minimum wall thickness required by the tolerances in the specification to which the pipe was manufactured; or
 - 2. The nominal wall thickness required for the design pressure of the pipeline.
- D. Each of the following dents must be removed from steel pipe to be operated at a pressure that produces a hoop stress of 20 percent or more of SMYS:
 - 1. A dent that contains a stress concentrator such as a scratch, gouge, groove or arc burn.
 - 2. A dent that affects the longitudinal weld or a girth weld.
 - 3. In a pipe to be operated at a pressure that produces a hoop stress of 40 percent or more of SMYS, a dent that has a depth of:
 - a. More than one-quarter inch in pipe 12-3/4 inches or less in ~~outer~~ outside diameter; or
 - b. More than 2 percent of the nominal pipe diameter in pipe over 12-3/4 inches in ~~outer~~ outside diameter.

Note:

For the purposes of this section a “dent” is a depression that produces a gross disturbance in the curvature of the pipe wall without reducing the pipe wall thickness. The depth of a dent is measured as the gap between the lowest point of the dent and a prolongation of the original contour of the pipe.

- E. A gouge, groove, arc burn, or dent that is removed from a length of pipe may not be repaired by insert patching or by hammering it out.

- F. Each gouge, groove, arc burn, or dent that is removed from a length of pipe must be removed by cutting out the damaged portion as a cylinder.

1400 COATING – PROTECTIVE – GENERAL

1401 SCOPE

This Standard covers the specification for the protective coating to be applied to metallic materials used in the construction and maintenance of distribution and supply facilities.

1402 GENERAL REQUIREMENTS

A. Mill Coatings

1. Mill Coatings

- a. Fusion-Bonded Epoxy – underground coated steel pipe ½” NPS through 12” NPS. Scotchkote 6233 or 206N is the basis of design for all RCID underground natural gas piping systems. Other systems listed below may be used with the prior written approval of the RCES Gas Engineer.
 - i. Polyethylene Plastic – underground coated steel pipe ½” NPS through 12” NPS.
 - ii. Plasticized Coat Tar Enamel – underground coated steel pipe ½” NPS through 12” NPS.

2. Mastic, Glasswrap and 100% Solids Epoxy

- a. Underground direct buried valves.
- b. Other underground appurtenances whose irregular shape prevents good coating by other approved means.
- c. Valve roadway boxes.
- d. Bolt-type compression couplings.
- e. Underground pipe joints, smooth fittings and branch connections.

3. Plastic Adhesive Tape and Primer and 100% Solids Epoxy

Underground pipe joints, smooth fittings, branch connections, and service riser pipe.

4. "Hot-Melt Patch Stick" Compounds

Repair of holidays and minor (< 1 sq. in.) damage to fusion-bonded epoxy mill coatings.

5. Universal Primer – Shop Applied by Vendor

All uncoated and unpainted purchased ferrous products, including but not limited to:

- a. Bare steel pipe and nipples
- b. Valve and valve components for underground service
- c. Ferrous fittings for underground service

6. Paint – Spray Application by Vendor

- a. Pre-fabricated meter assemblies
- b. Meter and service riser brackets
- c. Other painted metallic materials for above ground construction excluding gas meters, regulators and valves

7. Paint – Brush Application

- a. Fabrication of meter-regulator assemblies
- b. Fabrication of above-ground or vault installation of regulating stations
- c. Other related piping and appurtenances

B. Maintenance

1. Maintenance of coatings for exposed piping shall conform to the requirements of Table 1401 in this Standard.
2. Repair of underground coatings as described in Section 1402 A.1 of this Standard shall be made with mastic and glasswrap, plastic adhesive tape and primer, 100% solids epoxy repair kits, or "hot melt patch sticks." Existing

coatings will be removed commensurate to the size of the defect and in accordance with the applicable repair procedures located throughout the Standard.

TABLE 1401

PIPE COATING (NEW OF EXISTING)	JOINT COATING	MAINTENANCE COATING OR MATERIAL
Polyethylene plastic (X-TRU-COAT) ½" – 12"	Plastic adhesive tape and primer or mastic and glasswrap	Plastic adhesive tape and primer or mastic and glasswrap
Coal tar base	Coal tar tape or mastic and glasswrap	Mastic and glasswrap
Paint	1. Zinc chromate primer. 2. Industrial enamel paint	Rust inhibitive primer and top coat outdoor yellow metal enamel
Fusion-bonded epoxy (3M Scotchkote 6233 or 206N or Axalta NAPGARD) ½" – 12"	Plastic adhesive tape and primer or 100% solids two component epoxy or field applied epoxy powder	Plastic adhesive tape and primer or 100% solids two component epoxy or field applied epoxy powder

1500 COATING – PROTECTIVE – FIELD APPLIED PLASTIC ADHESIVE TAPE

1501 SCOPE

This Standard provides the specification for the field applied coating of plastic adhesive tape to be used on joints of mains and services ½” NPS through 12” NPS in below ground applications.

1502 SPECIFIC REQUIREMENTS

Wrapping may be accomplished with manually or by use of a “Tapester” of equivalent mechanical wrapping machine on suitably clean, dry pipe.

A. Surface Preparation

1. Remove rust, scale, coatings or other foreign matter preferably by commercial blast cleaning to SSPC SP-6 standards.
2. Wire brushing using powered equipment will be acceptable where sand blasting is impractical.
3. Solvent clean the pipe with a solvent that does not leave a residue.

B. Priming

1. The primer used shall be compatible with the plastic adhesive tape used. Coverage shall be no greater than 350 square feet per gallon or the manufacturer’s recommendations.
2. Primer shall be tacky to the touch, but not dry, before tape is applied.

C. Taping and Wrapping

1. Plastic adhesive tape shall be spiral wrapped either manually or by use of a "Tapester" or equivalent mechanical wrapping machine.
2. Tape dimensions, tape width, roll length and overlap distance shall be as follows:

Pipe Size	Tape Width	Overlap		Approximate Squares/1000'
		Min.	Max.	
1/2" & 3/4"	2"	1/4"	1/2"	3.2
1" – 1-1/2"	2"	1/4"	1/2"	4.7
2"	2"	1/4"	1/2"	6.9
Over 2"	4"	Wrap Manually		

Note: One Square = 100 feet

3. The tape shall be applied with a uniform lap width, free of wrinkles, puckers and voids.

D. Inspection

1. General inspection of the tape coating shall include examination of the lap uniformity and smoothness of spiral coating.
2. Tape coatings shall be visually checked for cracks or other defects.
3. Tape coatings shall be holiday tested with a high-voltage holiday detector for voids, pinholes and other holidays.
4. Defect locations shall be clearly marked.

E. Repair of Coating Defects

Repairs shall be made by spiral wrap with plastic adhesive tape at least six inches beyond the defect area and retested. If the defect is still apparent, the tape and primer shall be stripped and the coating reapplied.

1503 OTHER USES FOR PLASTIC ADHESIVE TAPE

- A. Plastic adhesive tape may be used for maintenance purposes. The width of the tape shall be selected based on the requirements of the job.
- B. Polyethylene plastic and fusion-bonded epoxy coatings – Spiral wrap with plastic adhesive tape over the existing coating. Wrapping may be accomplished either manually or by machine.

1600 COATING – PROTECTIVE – FIELD APPLIED PLASTIC COAL-TAR TAPE

1601 SCOPE

This Standard provides the specification for a field applied coating of cold applied coal tar tape and primer to be used on underground pipe joints, smooth fittings and branch connections.

1602 PIPE – SPECIFIC REQUIREMENTS

A. Application

Wrapping shall be accomplished manually on a clean dry surface. Wrapping shall be undertaken without added heat only if the temperature is over 25 degrees F. A slight warming of the tape with a torch is necessary where the temperature is 25 degrees F or less.

1. Surface Preparation

- a. Remove rust, scale, weld slag and all other foreign materials by wire brushing.
- b. Kraft paper shall be removed adjacent to the area to be wrapped and the mill coating beveled to provide a good bond on the coal tar mill coating.
- c. Polyethylene plastic mill coatings shall be roughed up with emery cloth, wire brush or rasp in the area adjacent to that be wrapped.

2. Priming

- a. The primer shall be compatible with the coal tar tape used. The tape is designed to be installed over tacky primer.
- b. The surface to be wrapped shall be warm to the touch before primer is applied.

3. Taping and Wrapping

- a.

Tape Dimensions	Tape Width
1/2" – 2" NPS	2"
2-1/2" – 12" NPS	4"
- b. The tape in 2" and 4" widths shall be spiral wrapped with a 50% overlap (equivalent to double-wrap).

- c. Iron fittings (compression couplings, ells, adapters, etc.) with metal pipe shall be spiral wrap with a 50% overlap.
- d. Brass fittings do not require wrapping. However, to provide an effective seal, steel pipe adjacent to brass fittings shall be spiral wrapped with coal tar tape overlapping the brass fitting.
- e. Service tee connections – all steel mains 4” NPS and smaller require complete encirclement field coating at the point where the connection is made. Steel mains 6” NPS and larger can be patched in the area of the service tee connection with the undamaged coating overlapped with a minimum of 3 inches.

4. Inspection

- a. General inspection of the tape coating shall include examination of the lap uniformity and smoothness of the spiral coating.
- b. Tape coatings shall be visually checked for cracks or other defects.
- c. Tape coating shall be holiday tested with a high voltage holiday detector for voids, pinholes and other holidays.
- d. Defect locations shall be clearly marked.

1603 REPAIR OF DAMAGED AREAS OR SPOTS ON MILL COATINGS

A. Plasticized Coal Tar Enamel and Wax Base

All damaged spots shall have the mill coating removed to bare clean metal for an area at least one inch larger in all directions. The bare surface shall then be prepared as outlined in 1602 A of this Standard.

B. Polyethylene Plastic and Fusion Bonded Thin Films

Damaged spots shall be wrapped as outlined in 1602 A of this Standard with no additional coating removed in the vicinity.

1700 COATING – PROTECTIVE FIELD- APPLIED MASTIC & LIQUID EPOXY

1701 SCOPE

This Standard covers the specification for a field applied coating of coal tar mastic to be used on all underground direct buried valves, pipe joints, and other appurtenances whose irregular shape prevents a good coating from being achieved by other approved means.

1702 SPECIFIC REQUIREMENTS

A. Application

1. Surface Preparation

- a. Remove rust, scale or other foreign matter preferably by commercial sand blasting to SSPC SP6 standards.
- b. Universal primer, when present, can be left if it is in sound condition.

2. All buried valves (including operator extension and lubricating stem extension); valve boxes and other irregularly shaped appurtenances including associated flanges, bolts, and nuts shall be given two (2) coats of mastic and sealed with a circumferential wrap of tape or mastic and glasswrap. Allow 30 minutes drying time between coats plus sufficient drying time for mastic to set up (dry) before backfilling.

3. The following items do not require coating:

- a. Plastic portions of valve boxes.

1800 COATING – PROTECTIVE FIELD-APPLIED MASTIC FIBERGLASS WRAP

1801 SCOPE

This Standard covers the specification for field coating bolt type compression couplings, underground direct buried valves, pipe joints, and other miscellaneous clamps, sleeves, etc. installed on steel gas piping with field applied mastic fiberglass wrap.

1802 SPECIFIC REQUIREMENTS

A. Fittings without Factory Coating

1. Use mastic and primer conforming to this Standard.
2. Coat bare pipe, fittings and the mill coating with primer.
3. Apply one (1) coat of mastic over primed area, overlapping the mill coating on both sides of the fitting.
4. Using 4" wide fiberglass, loosely spiral wrap the area of mastic.
5. Apply a second coat of mastic over the top of the spiral wrap of fiberglass.

B. Fittings with Factory Coating

1. Coat bare pipe, fitting and mill coating as follows:
 - a. Apply primer.
 - b. Apply one (1) coat of mastic.
 - c. Cigarette wrap a 4" width of fiberglass overlapping the fitting. While the mastic is still wet, apply a second coat of mastic.
2. No other coating material or wrapping is required on pre-coated fittings unless minor patching repairs are needed. These shall be done with mastic.
3. If the RCES Inspector, RCES Gas Engineer, or other properly empowered Owner's agent determines that extensive coating damage has occurred, a complete wrap as prescribed in Section 1802.B.1. of this Standard shall be made.

1900 COATING – PROTECTIVE BRUSH APPLICATION OF PAINT

1901 SCOPE

This Standard covers the specification for paint application to be used on meter-regulator assemblies, above-ground regulating stations and related piping and appurtenances, installed above-ground. Fasteners and other factory coated hardware shall not be coated as specified in this Standard.

1902 SPECIFIC REQUIREMENTS

A. Application

Primer and finish coat shall be applied manually by brush or spray. Do not apply outdoors in cold, damp or foggy weather.

1. Surface Preparation

- a. Remove rust, scale or other foreign matter preferably by commercial sand blasting to SSPC SP6 standards. Wire brushing and/or pressure washing will be acceptable where sand blasting is impractical.
- b. Remove grease and oil by wiping with a solvent that does not leave a residue.
- c. All rough surfaces shall be sanded, filed, or otherwise ground smooth.
- d. The surface must be completely dry prior to priming and painting.

2. Priming

- a. Prime all surfaces with one coat of DuPont 25P Epoxy Mastic Primer or PPG Pitt-Guard Rapid Coat Epoxy at 5 to 7 mils DFT.
- b. If thinner is needed or desired, strictly follow the manufacturer's instructions.
- c. Stir thoroughly from bottom of container with an upward motion.
- d. Application may be performed by brush, conventional or airless spay methods.

- e. Allow at least two (2) hours drying time before applying finish coat under normal drying conditions. A longer period of time is required at lower temperatures and/or higher humidity.

3. Finish Coat

- a. Apply one coat of DuPont Imron 333 High Solids Polyurethane or PPG Pitthane Ultra High Solids Polyurethane at 2-3 DFT. Color shall be "Safety Yellow."
- b. Application may be performed by brush, conventional or airless spray methods.
- c. Stir thoroughly from bottom of container with an upward motion.
- d. Generally, one application of the finish coat shall be adequate. If additional coats are required, particularly with light colors such as "Safety Yellow", allow twenty-four (24) hours before recoating.

2000 COATING – PROTECTIVE FUSION-BONDED EPOXY COATINGS

2001 SCOPE

This Standard covers the specification of mill and field applied thin-film epoxy coatings and the field repairs of defects, holidays and joint coating. See Table 2001 for applications.

2002 GENERAL REQUIREMENTS

A. Approved Epoxy Thin-film Mill Coatings

1. Scotchkote 206N: blue-green in color
2. Scotchkote 6233: blue-green in color
3. NAP-GARD MARK X, Product 7-2501: red-brown in color
4. Do not mix the products of different manufacturers except where specifically permitted in this Standard. Tapes and primers of one manufacturer may be applied to mill coatings of another manufacturer.
5. Epoxy coatings and hot melt sticks shall be used only on mill coatings of the same manufacturer.

B. Mill Coating Thickness

1. Open Trench Pipe Installation: Pipe for standard open trench installation shall have a nominal coating thickness of 12-14 mils DFT as measured by a calibrated magnetic thickness gauge. Coating thickness variability shall be within the manufacturer's standards but in no case shall the thickness be less than 12 mils DFT nor greater than 20 mils DFT.
2. Bore-hole Pipe Installation: Pipe meant for installation directly in a bore-hole without the use of a casing shall be coated to a nominal thickness of 25 mils DFT with minimum and maximum thickness limits of 20 mils DFT and 30 mils DFT, respectively.
3. Mill coatings of fusion bonded thin-film epoxy shall be applied only by a qualified applicator. Applicator's qualification certification by the coating manufacturer shall be submitted to the RCES Gas Engineer for approval along with the applicator's detailed procedures and specifications.

2003 FIELD APPLICATION FOR JOINTS AND REPAIRS

A. Welded Field Joint Coatings and Major Repairs to Mill Coatings:

Welded field joint coating and major repairs (> 1 sq. in.) shall be made using one of the following procedures:

1. Primer and Tape Coatings

Tape coatings shall be used only on open trench pipe strings and pipelines within a casing.

All field joints and fittings of buried steel piping shall be cleaned with sandpaper and solvent wipe, primed with Polyken #927 pipeline primer or equivalent and then taped with a polyethylene or polyvinylchloride tape equivalent to Polyken Joint Wrap #930. Tapes shall be a minimum of 2" width and shall be applied with a minimum wrap overlap of 1". Tape thickness shall be not less than 10 mils so that half-lapped wraps provide a minimum taped thickness of 20 mils. All fitting and joint wrapping shall overlap pipe the mill coating a minimum of 2". The mill coating to be overlapped shall be roughened with sandpaper prior to primer application.

2. Field Applied Epoxy Power for Weld Joints and Major Repairs

This specification is optional for open trench pipe strings but is mandatory for weld joint coating and major repairs on bore hole strings.

- a. For repairs, cut back the mill coating around the entire pipe circumference at least two (2) inches from the area to be recoated.
- b. Prior to blast cleaning, the zone to be recoated shall be cleaned with a non-residual solvent to remove mud, oil, grease and all loosely adhering deposits.
- c. The exposed metal shall be abrasive blast cleaned to SSPC SP10 or NACE TM-01-70 #2 near-white finish using dry, 30-60 mesh sand. The adjacent fusion bonded mill coating shall be brush blasted to clean and roughen the coating surface for a distance of six (6) inches back from the mill coating cut-back. The blast cleaned area shall have an anchor profile not less than 2.0 mils or greater than 4.0 mils. Blast cleaned pipe surfaces shall be protected from conditions of high humidity, rainfall and surface moisture. The blast cleaned metal shall not be allowed to flash rust before the application of the coating.
- d. The weld zone shall be heated to a temperature of 500 degrees F using a circumferential induction heating coil of sufficient size, width and power to provide the required heat in the coating zone and two (2) back under the fusion bonded mill coating on the pipe. Graduated "Tempil-sticks" shall be used to measure the pipe temperature. Only the small spot of metal shall be touched by the "Tempil-stick." Alternatively, a calibrated Type "K" thermocouple surface-type pyrometer may be used. If a pyrometer is

used, submit to the RCES Gas Engineer records of calibration dated within six (6) months of projected date of use.

- e. Immediately after heating and while the pipe temperature is between 425 and 475 degrees F, the pipe shall be coated with Scotchkote 206N, Scotchkote 6233 or NAP-GARD Mark X 7-2501 powder at the specified thickness of the adjacent mill coating following all of the manufacturer's recommendations and guidelines. Application should be performed as rapidly as possible to prevent premature cooldown of the heated zone. The coating shall be applied over the full width of the exposed area of the pipe and overlap the mill coating no less than one (1) inch.
 - f. The coating shall cure from the residual heat remaining in the pipe. No force cooling or quenching shall be allowed and the heat zone shall be protected from adverse weather conditions such as rain and high winds.
 - g. Upon completion of the coating operation, the coating shall be electrically inspected for continuity using a 1500 volt DC detector to check for holidays, pinholes and discontinuities. Inspection and repair may commence after the heat zone has cooled to 200 degrees F.
3. Field Applied 100% Solids Liquid Epoxy for Weld Joint Coating and Major and Minor Repairs.

This specification is mandatory for all minor repairs (<1 sq. in.) on bore hole strings and is optional for major and minor repairs on open trench pipe strings. This specification may be used for weld joint coating on bore hole piping only with the approval of the RCES Gas Engineer. This specification may be used without reservation for joint coating on open trench pipe strings.

- a. Acceptable products are two-part Scotchkote 323. Follow all manufacturer's recommendations and application procedures.
- b. Do not apply at ambient or pipe temperatures below 55 degrees F. Ambient temperature must also be 5 degrees F above the dew point. Apply in coats of no greater than 25 mils wet film thickness (WFT) to avoid sag. Build coats until the final minimum DFT is 20 to 25 mils for open trench piping and ~~25~~—30 mils for bore hole piping.
- c. Metal surfaces to be coated shall be prepared in accordance with Standard 2003 A.2.c. except where this product is used for minor repairs of mill coatings. In this case, the pipe preparation may be performed using a surface grinder, sandpaper and wire brushes. The adjacent mill coating shall be feathered and roughened to enhance adhesion of the repair.
- d. Product application for minor repairs may be made using a brush or roller. Spray application shall be used for weld joint coating and major repairs.

- e. Primer and tape may be used only with prior approval from the RCES Gas Engineer.

B. Minor Repairs to Mill Coatings

Minor repairs (<1 sq. in.) and holidays, scrapes, scars and coating imperfections shall be made using one of the following methods:

1. Primer and tape as specified in Standard 2003 A.1 for open trench piping only.
2. 100% solids epoxy as specified in Standard 2002 A.2, mandatory for bore hole piping and optional for open trench piping.
3. "Hot Melt Patch Compounds"; either Scotchkote 206P or NAP-GARD 7-1632.

TABLE 2001 FUSION BONDED EPOXY PIPE MILL COATINGS FOR MAINS AND SERVICES, WELD JOINT COATINGS, DEFECT AND HOLIDAY REPAIRS		
<u>APPLICATION</u>	<u>ACCEPTABLE MATERIALS AND METHODS</u>	
	Open Trench Strings	Bore Hole Strings
Weld Joint Coatings	1. Primer and Tape	1. Epoxy Powder applied with heat induction
	2. 100% Solids Epoxy Liquid	2. 100% Solids Epoxy Liquid
	3. Epoxy Powder applied with heat induction	
Major Repairs (> 1 sq. in.)	1. Primer and Tape	1. Epoxy Powder applied with heat induction
	2. 100% Solids Epoxy Liquid	2. 100% Solids Epoxy Liquid
	3. Epoxy Powder applied with heat induction	
Minor Repair (< 1 sq. in.)	1. Hot Melt Sticks	1. 100% Solids Epoxy Liquid
	2. Primer and Tape	2. Hot Melt Sticks (with RCES Gas Engineer Approval)
	3. 100% Solids Epoxy Liquid	
	4. Epoxy Powder applied with heat induction	
Holidays	1. Hot Melt Sticks	1. Hot Melt Sticks
	2. Primer and Tape	2. 100% Solids Epoxy Liquid
	3. 100% Solids Epoxy Liquid	
	4. Epoxy Powder applied with heat induction	

2100 PROCEDURE – JOINING OF THREADED JOINTS

2101 SCOPE

This Standard outlines the basic requirements to be following to fabricate joints with threaded components.

2102 REQUIREMENTS

A. Material

1. Threaded fittings and valves shall comply with the appropriate Standards located throughout the “Reedy Creek Improvement District HPG/MPG Natural Gas Piping New Construction Standards”.
2. Threaded pipe, fittings and valves removed from any existing installation shall not be used again until they have been thoroughly cleaned, inspected and a determination made by a qualified individual that they are equivalent to new material.
3. Pipe and fittings shall be clear and free from cutting burrs, defects in structure or threading and shall be thoroughly brushed to remove all chips and scale. Defective pipe or fittings shall not be prepared, but returned to the storeroom or otherwise recycled.
4. Joint compound (pipe dope) shall be resistance to the actions of any chemical constituents of the gases that may be conducted through the piping. It shall be applied sparingly and completely around the only male threads of the joint.

B. Threads

1. Pipe and fitting threads shall comply with ASME B1.20.1, 2013 Edition "Pipe Threads General Purpose (inch)."
2. Pipe shall be threaded in accordance with the following table:

Nominal Pipe Size	Approximate Length of Threaded Portion	Approximate Number of Threads to be Cut
1/8"	3/8"	10
1/4"	1/2"	10
3/8"	1/2"	10
1/2"	3/4"	11
3/4"	3/4"	11
1"	1"	12
1-1/4"	1"	12
1-1/2"	1"	12
2"	1"	12
3"	1-1/2"	12
4"	1-5/8"	13
6"	1-7/8"	15

2200 METERING AND REGULATION

2201 CUSTOMER METER INSTALLATION – OPERATING PRESSURE

A meter may not be used at a pressure that is more than 67% of the manufacturer's shell test pressure.

2202 CUSTOMER METER AND REGULATOR - LOCATIONS

- A. The following guidelines comprise the standard RCES practice. Deviations may be permitted as site conditions warrant with the approval of the RCES Gas Engineer and the RCES Gas Utility Services Manager. Deviations will not be granted for matter for convenience of installation only.
1. Medium Pressure Gas Service with a meter/regulator set located at the structure service entry:
 - a. Locate the meter/regulator set outside the structure as close to the service entrance as possible.
 - b. If possible, avoid burying the low pressure house service line. Route the low pressure house service line directly into the structure through the exterior wall.
 2. Medium Pressure Gas Service to a Master Meter located remotely from the structure(s) and RCES regulators (medium pressure gas to house service pressure gas):
 - a. Locate the RCES gas regulators outside the structure that they serve as close to the house service entrance as possible.
 3. High Pressure Gas service to a Master Meter/Regulator (HPG to MPG) with medium pressure distribution and RCES MPG-to-house pressure regulators located as in 2202.A.2.
 - a. The Master Meter/Regulator shall be located as close to the property line as practical while providing a safe and accessible location.
 4. High Pressure Gas service to a Master Regulator (HPG to MPG) with medium pressure distribution and RCES Meter/Regulator sets located as in 2202.A.1.

- a. The location of the HPG-to-MPG Master Regulator shall be located as close to the property line as practical while providing a safe and accessible location.
- B. Each meter and each service regulator, whether inside or outside of a structure, must be installed in a readily accessible location and be protected from corrosion and other damage.
- C. Each service regulator installed within a structure must be located as near as practical to the point of service line entrance.
- D. Each meter installed within a structure must be located in a ventilated place and not less than three (3) feet from any source of ignition or any source of heat which might damage the meter.
- E. Where feasible, the upstream regulator in a series must be located outside the structure, unless it is located in a separate metering or regulating structure.

2203 CUSTOMER METER AND REGULATOR – INSTALLATION

- A. Each customer requiring gas service must submit a Utility Service Request (USR) which will supply the RCES Gas Department with the following information in sufficient time for the RCES Gas Department to meet the customer's needs. The following information must be included on the USR for the RCES Gas Department to provide the appropriate gas meter and/or regulator:
 1. The total connected load of all gas consuming appliances.
 2. The BTUH input rating and pressure required for each appliance.
 3. The anticipated maximum annual demand of each facility served by a meter or regulator supplied by RCES.
 4. The requested gas pressure at each service subject to the following restrictions:
 - a. RCES will supply one gas service pressure for each house service.
 - b. It is the policy of RCES to deliver gas at pressures between 7" w.c. and 14" w.c. unless there are extenuating circumstances that justify gas delivery at a higher pressure. All requests for pressures that fall outside of this range will be reviewed on a case-by-case basis by the RCES Gas Engineer.
 - c. The requested house service pressure shall be as low as practical and still meet the requirements for the most demanding appliance. In general,

RCES will require the active approval of the RCID Building and Safety Department to supply a house service pressure in excess of 1 psig.

- d. All gas customers should be aware that RCES supplied regulators provide overpressure protection at 2 psig. All customer supplied gas appurtenances shall be rated for a minimum gas pressure of 2 psig.
 - e. With the possible exception of specific, attraction-related services, no house service will be supplied in excess of 5 psig.
- B. All fittings used in the connection of meters and/or regulators shall be painted "Safety Yellow" at the time of installation.
- C. Connections made of lead or other easily damaged material may not be used in the installation of meters and regulators.
- D. Each regulator that might release gas in its operation must be vented to the outside atmosphere, if located inside a structure. If located outside a building, each regular that might vent gas near the intake of a building ventilator intake, shall be vented to an area remote from the ventilator.

2204 CUSTOMER METER AND REGULATOR – PROTECTION FROM DAMAGE

- A. Protection from Vacuum or Back Pressure:
- 1. If the customer's equipment might create either a vacuum or a back pressure, a device must be installed to protect the system.
- B. Service Regulator Vents and Relief Vents:
- 1. The outside terminus of each service regulator vent and relief vent must:
 - a. Be rain and insect resistant;
 - b. Be located at a place where gas from the vent can escape freely into the atmosphere and away from any opening into the building; and
 - c. Not be located in areas where flood may occur

2205 INSTRUMENT, CONTROL, AND SAMPLING PIPE AND COMPONENTS

- A. All materials employed for pipe and components must be designed to meet the particular conditions of service and the following:
- 1. Each take-off connection and attaching boss, fitting, or adapter must be made of suitable material, be able to withstand the maximum service pressure and

temperature of the pipe or equipment to which it was attached, and be designed to satisfactorily withstand all stresses without failure by fatigue.

2. A shutoff valve must be installed in each take off line as near as practicable to the point of take-off. Blowdown valves must be installed where necessary or required by contract.
3. Pipe or components that may contain liquids must be protected from damage due to freezing by heating or other means.
4. Pipe or components in which liquids may accumulate must have drains or drips legs.
5. Pipe or components subjected to clogging from solids or deposits must have suitable connections for cleaning.
6. The arrangement of pipe, components and supports must provide a conservative factor of safety under the anticipated operating stresses.
7. Each point between sections of pipe, and between pipe and valves or fittings, must be made in a manner suitable for the anticipated pressure and temperature conditions. Slip type expansion joints may not be used. Expansion must be allowed for by providing flexibility within the system itself.
8. Each control line must be protected from anticipated causes of damage and must be designed and installed to prevent damage to any one control line from making both the regulator and the overpressure device protective device inoperative.

2206 REQUIREMENTS FOR DESIGN OF PRESSURE RELIEF AND LIMITING DEVICES

- A. All materials employed for pipe and components must be designed to meet the particular conditions of service and the following:
 1. Be constructed of materials such that the operation of the device will not be impaired by corrosion
 2. Have valves and valve seats that are designed not to stick in a position that they make the device inoperative
 3. Be designed and installed so that it can be readily operated to determine if the valve is free, can be tested to determine the pressure at which it will operate, and can be tested for leakage when in the closed position
 4. Have support made of non-combustible material

5. Have discharge stacks, vents, or outlet ports designed to prevent accumulation of water, located where gas can be discharged into the atmosphere without undue hazard
6. Be designed and installed so that the size of the openings, pipe and fittings located between the system to be protected and the pressure relieving device, and the size of the vent line, are adequate to prevent hammering of the valve and to prevent impairment of relief capacity
7. Where installed at a district regulator station to protect a pipeline system from over-pressurization, be designed and installed to prevent any single incident such as an explosion in a vault or damage by a vehicle from affecting operation of both the over-pressure protective device and the district regulator
8. Be designed to prevent unauthorized operation of any stop valve that will make a pressure relief valve or pressure limiting device inoperative, by removing handle or otherwise providing locking devices with the exception of a valve that will isolate the system under protection from its source of pressure

2207 REQUIRED CAPACITY OF PRESSURE RELIEVING AND LIMITING STATIONS

- A. Each pressure relief station or pressure limiting station or group of those stations installed to protect a pipeline must have enough capacity and must be set to operate to prevent the pressure from exceeding the maximum allowable operating pressure (MAOP) plus 10 percent.
- B. When more than one (1) pressure regulating station feeds into a pipeline, relief valves or other protective devices must be installed at each station so that the complete failure of the largest capacity regulator, or any single run of lesser capacity regulators in that station, will not impose pressures on any part of the pipeline or distribution system in excess of those pressures for which it was designed or against which it was protected, whichever is lower.
- C. In a low pressure system, relief valves or other protective devices must be installed to prevent a pressure that would cause any properly adjusted equipment connected to the system to be unsafe.
- D. In a low pressure system, relief valves or other limiting devices should be installed at or near each regulating station with sufficient capacity to limit the maximum pressure to that which will not exceed the safe operating pressure of any properly adjusted equipment connected to the system.

2208 CONTROL OF THE PRESSURE OF GAS DELIVERED FROM HIGH PRESSURE AND MEDIUM PRESSURE GAS DISTRIBUTION SYSTEMS

- A. If the maximum actual operating pressure of the distribution system is equal to or less than 60 psig and a service regulator having the following characteristics is used, no other pressure limiting device is required:
1. A regulator capable of reducing distribution line pressure to pressures recommended for household appliances
 2. A single port regulator with the proper orifice size for the maximum gas pressure at the regulator inlet
 3. A valve seat made of resilient material designed to withstand abrasion of the gas, impurities in the gas, cutting by the valve, and be able to resist permanent deformation when it is pressed against the valve port.
 4. Pipe connections to the regulator do not exceed 2" in diameter
 5. A regulator that, under normal conditions, is able to regulate the downstream pressure within the necessary limits of accuracy and to limit the build-up of pressure under no flow conditions to prevent a pressure that would cause the unsafe operation of any connected and properly adjusted equipment
 6. A self-contained service regulator with no external static or control lines
 7. All service regulators installed shall contain an overpressure protective device
- B. If the maximum actual operating pressure of the distribution system is 60 psig or less and a service regulator does not have all of the characteristics listed in Section 2208 A of this Standard is used, or if the gas contains materials that seriously interfere with the operation of the service regulators, there must be suitable protective devices to prevent unsafe over pressurization of the customer's appliances if the service regulator fails.
- C. If the maximum actual operating pressure of the distribution system is more than 60 psig, one of the following methods must be used to regulate and limit, to the maximum safe value, the pressure of gas delivered to the customer.
1. A service regulator having the characteristics listed in Section 2208 A of this Standard and another regulator located upstream from the service regulator is used in tandem. The upstream regulator may not be set to maintain a pressure

higher than 60 psig. A device must be installed between the upstream regulator and the service regulator to limit the pressure on the inlet of the service regulator if the upstream regulator malfunctions. This device may be either a relief valve or an automatic shutoff that shuts if the pressure on the inlet of the service regulator exceeds the set pressure (60 psig or less) and remains closed until manually reset.

2. A service regulator and a monitoring regulator set to limit, to a maximum safe value, the pressure of the gas delivered to the customer.
3. A service regulator with a relief valve vented outside to the outside atmosphere, with the relief valve set to open so that the pressure of the gas going to the customer does not exceed a maximum safe value. The relief valve may either be built into the service regulator or it may be a separate device installed downstream from the service regulator. This combination may be used alone only in those cases where the inlet pressure in the service regulator does not exceed the manufacturer's safe working pressure rating of the service regulator and may not be used where the inlet pressure on the service regulator exceeds 125 psig. For higher inlet pressure, the methods in Sections 2208 C.1. and C.2. of this Standard may be used.
4. A service regulator and an automatic shutoff device that closes upon a rise in pressure downstream from the regulator and remains closed until manually reset.

2209 PROTECTION AGAINST ACCIDENTAL OVERPRESSURIZATION

A. General Requirements

Except as provided in Section 2208 A of this Standard, each pipeline that is connected to a gas source where the MAOP could be exceeded as the result of pressure control failure or of some other type of failure must have pressure relieving or pressure limiting devices that meet the requirements of Sections 2206 and 2207 of this Standard.

B. Additional Requirements for Distribution Systems

Each distribution system that is supplied from a source of gas that is at a higher pressure than the MAOP for the system must:

1. Have pressure regulation devices capable of meeting the pressure, load and other service conditions that will be experienced in the operation of the system and that could be activated in the event of failure of some portion of the system; and
2. Be designed so as to prevent accidental over pressurization.

2300 VAULTS

2301 STRUCTURAL DESIGN REQUIREMENTS

- A. Each underground vault or pit for valves, pressure relieving, pressure limiting or pressure regulating stations must be able to withstand the loads which may be imposed upon it and to protect the installed equipment that it contains. All lids, covers, manways and vaults must be able to withstand H2O wheel loads with cover deflections of no greater than $L/200$.
- B. There must be enough working space so that all of the equipment required in the vault or pit can be properly installed, operated and maintained. Additionally, the vault or pit must be sized to permit at least two average sized people to enter when equipped with safety harness that are attached to manway lifts. These requirements are meant to provide vaults and pits that will be usable under the RCES Confined Space Entry Procedures.
- C. Each pipe entering, or within a regulator vault or pit must be steel except that instrument and control piping may be copper, steel, or other acceptable material. When piping extends through the vault or pit structure, the openings must be sealed to prevent the passage of gases or liquid through the opening.

2302 ACCESSIBILITY

Each vault by be located in an accessible location and, so far as practical, away from the following:

1. Street intersections or points where traffic is heavy or dense
2. Points of minimum elevation, catch basins or places where the access cover will be in the course of surface waters, and
3. Water, electric, steam or other facilities

2303 SEALING, VENTING AND VENTILATION

Each underground vault or closed top pit containing either a pressure regulating or reducing station or a pressure limiting or relieving station must be sealed, vented and/or ventilated as follows:

- A. Locations where the internal volumes exceeds 200 cubic feet shall meet the following criteria:
 1. The vault or pit must be ventilated with two (2) ducts, each having at least the ventilating effect of a pipe 4 inches in diameter and

2. The ventilation must be enough to minimize the formation of a combustible atmosphere in the vault or pit and
 3. The ducts must be high enough above grade to disperse any pas-air mixture that might be discharged.
- B. When the internal volume is more than 75 cubic feet but less than 200 cubic feet shall meet the following criteria:
1. If the vault is located under an area carrying vehicular traffic, it must have a tight-fitting cover without open holes through which an explosive mixture might be ignited and there must be a means for testing the internal atmosphere before removing the cover.
 2. If the vault is located in an area which does not carry vehicular traffic, it must be ventilated with two ducts, each having at least the ventilating effect of a pipe 4 inches in diameter.

2304 DRAINAGE AND WATER-PROOFING

- A. Each vault must be designed so as to minimize the entrance of water.
- B. A vault containing gas piping may not be connected by means of a drain connection to any other above or below ground structure.
- C. All electrical equipment in vaults must conform to the applicable requirements of Class 1, Group D of the National Electrical Code (NEC).

2400 TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS IN ROADWAYS

2401 SCOPE

This Standard sets forth basic principles and prescribed minimum standards to be followed in the application of traffic control devices required for roadway construction and maintenance operations such as signs, signals, marking, barricades, lights and flagmen. These principles and standards are designed to:

- A. Protect the public and the workforce
- B. Minimize inconvenience and economic loss to the public
- C. Maintain public goodwill

2402 GENERAL REQUIREMENTS

- A. All hazards related to the work within the public right-of-way (or so closely adjacent as to create hazards for the public or for the workforce), or detour around the work, shall be marked with well painted, well-maintained barricades, lanterns, reflectors, electric lights, flashers and caution, warning and directional signs in sufficient numbers. Equipment used to mark all hazards shall be moved, changed, increased or removed as required during the progress of the work to meet changing conditions.
- B. All work zone traffic control shall be in accordance with all applicable requirements in the FDOT Utility Accommodation Manual and all RCID MOT requirements.
- C. During the hours of darkness, all hazards shall be lighted by means of lanterns, flashers, or electric lights. Where field conditions permit, lights shall be attached to or hung from the barricade. All signs shall be reflectorized or illuminated.

2403 SPECIFIC REQUIREMENTS

- A. Barricades:

Barricades are intended to impose an obstacle, real or apparent, in the normal channel of travel, or to mark a limited channel of travel. They must be intrinsically highly visible, but they should also be protected by adequate advance warning devices and by suitable lighting devices at night.

- 1. Class I Barricades (Urban Right-of-Way):

Class I barricades shall be used whenever a street, intersection or traffic lane of any Through Roadway is closed to traffic for a period of 24 hours or more.

Through Roadways are any streets to which access from any intersecting street is controlled by stop signs.

Class I barricades shall also be used whenever added protection is required because of volume or speed of traffic, or where the drivers' vision is limited or reduced because of traffic or natural obstructions.

2. Class II Barricades (Urban Right-of-Way):

Depending on field conditions, Class II barricades shall be placed in sufficient quantity to provide proper warning to, and for protection for the public.

Class II barricades shall be used as follows:

- a. In addition to Class I barricades to offer additional protection to the public from excavations and obstructions
- b. To correctly identify construction work areas
- c. To restrict traffic within construction areas
- d. To channel traffic around and protect employees within work areas.

3. Barricades, Placement on Rural Roadways:

Barricades made be placed at an angle across the roadway, but generally it is preferable to place a barricade at right angles to the direction of approaching traffic. A barricade should never be placed in the line of traffic without advance warning devices such as a line of cones to guide traffic around it. To narrow a roadway gradually, a series of barricades is often effective, with the first one on the shoulder and the succeeding ones each extending further into the roadway. A series of closely spaces cones or drums in line after a wing barricade can sometimes service the same purpose.

a. Class I Barricades (Rural Roadways)

Class I barricades shall be erected at points of closure where a road is closed to traffic. They may extend completely across a roadway and its shoulders as a fence, but where the road must remain open for access of equipment and other authorized vehicles, barricades should be provided with gates or movable sections. The Class I barricade is normally required for major operations where the barricade must remain in place for extended periods of time.

b. Class II Barricades (Rural Roadways)

Class II barricades are intended for use there the hazard is relatively small, as for example, on city streets, for the continuous delineation of a restricted roadway, or for temporary daytime use.

c. Wing Barricades (Rural Roadways)

In advance of a construction or maintenance area, even when no part of the roadway is actually closed, wing barricades serve a useful purpose in altering the driver. Wing barricades are Class I barricades erected on the shoulder, on one or both sides of the pavement, to give the sensation of a narrowing or restricted roadway. If used in a series, they should start at the outer edge of the shoulder and be brought progressively closer to the pavement.

B. Advance Warning, Placement on Urban Right-of-Way

1. Advance warning and channelizing shall be provided when natural hazards, or work operations interfere with vehicular traffic. Advance warning shall be provided by the use of additional barricades, cones or drums, lights, signs, flags or combinations thereof. High Level Warning Devices consisting of flags, lights, etc. or combinations thereof may be placed at the barricaded area as a substitute for advance warning devices.
2. High Level Warning Devices should be placed at a distance from the work area of approximately three times the posted speed limit. For example: In a 25 mph posted area the suggested distance is 3 times 25 which equals 75 feet for the High Level warning device from the work location.

The above applies to urban street traffic only and the advance warning distances shall be increased as the speed limit increases.

C. Advance Warning, Placement on Rural Highways and Roadways

1. Where normal open highway speeds prevail on the approach to the work site, advance warning signs should be placed at least 750 feet in advance of the condition to which they call attention. Where a series of advance warning signs is used, the warning sign nearest the work site should be placed 500 feet from the point of restriction with the additional signs at 500 foot intervals. Where prevailing speeds are low on the approach to the hazardous area, signs may be placed at 300 foot intervals in the immediate vicinity of the work. On high speed expressway type facilities the advance warning distance should be increased to one-half mile or more, as conditions dictate.
2. Advance warning and channeling shall be provided when natural hazards such as horizontal or vertical curves occur where sight distances are reduced. Barricading should start sufficiently in advance of the curve to be fully visible to approaching traffic.
3. A taper of 1:20 should be sufficient to permit traffic to shift safely from one lane to another under relatively normal conditions of speed and volume and where adequate advance warning has been provided. Where speeds or volumes are high this rate should be substantially decreased to about 1:40; express facilities

may require even longer tapers. Where traffic is stopped or considerably slowed in advance of the transition, as by flagmen, and where the lane change does not involve a merging of traffic streams, the taper may be reduced. Where two or more lanes of a multilane roadway are to be closed, traffic should not be forced to vacate more than a single lane at any one point, i.e. the points of closure of each lane should be separated in distance by 500 feet. A continuous taper across two or more lanes is permissible; however, where traffic already moving in a single line is required to shift lanes.

4. Flagman stations should be located far enough from the work site so that vehicles will have sufficient distance to slow down before entering the project but not so far that vehicles will tend to accelerate into the work site. The flagman should stand either on the shoulder adjacent to the lane of traffic he is controlling or in the barricaded lane. Under no circumstances should he stand in the traffic lane. He should stand alone clearly visible to traffic for a minimum distance of 500 feet and preceded by proper advance warning signs.

D. Warning Lights, Placement on Urban Right-of-Way

Warning lights shall be placed at the locations of all excavations, obstructions or other hazards during the hours of darkness. A sufficient number shall be used to give adequate warning to pedestrians and vehicular traffic. Not less than two warning lights shall be used at any hazard in the roadway.

E. Warning Lights, Placement on Rural Roadways

At night, recognition of reflectorized barricades and channelizing devices will occur only at limited distances and will also depend on the adequacy of the approaching headlamps. Therefore, independent light sources capable of being seen at long distances must be provided. These light sources include:

1. Lanterns: All single units, portable, constant illuminating low intensity type of lights are used only to supplement other channelizing devices or barricades, outline obstructions or other hazards, and to mark a flagman station. Lanterns placed in a row across the path of oncoming traffic should be no more than 8 feet apart and usually not less than 4 feet apart. Lanterns arranged in a longitudinal row should be spaced 15 to 25 feet apart where there is considerable hazard and farther apart where the hazard is less. Lanterns should be in place and lighted from sunset to sunrise. Generators used for powering lanterns shall be inspected and filled daily.
2. Flashers: Portable, battery-operated, lens-directed, enclosed electric lights shall flash at a rate of 70 to 120 flashes per minute; the "on" time shall be at least 25 percent of the cycle. Flashers are used for advance warning or for marking severe or unexpected hazards in or near the roadway. The color of the light shall be yellow. Flashers are best mounted on barricades at a height of 4 feet or more. The use of flashers in series is not recommended. During the hours of darkness, the flash shall be bright enough to be conspicuously visible at all

distances up to 800 feet from the unit under normal atmospheric conditions. Flashers shall be checked at sufficient intervals to verify their proper operation.

3. **Electric Lights:** Where commercial power or a portable electric generator is available, electric light may be used both for illumination and hazard marking. They can be used for floodlighting dangerous conditions and illuminating signs, barricades, and flagman stations. Lights for illuminating signs or barricades shall be sufficient in size and number to provide effective illumination and legibility under normal atmospheric conditions. A series of low-wattage yellow colored lamps may be used to mark obstructions and hazards or on longitudinal fence-type barricades to delineate the traveled way. Hazard marking lights shall illuminate steadily and shall not flash.

F. Signs, Placement on Urban and Rural Roadways

1. Only signs which apply to or describe the work conditions shall be used. Signs shall be properly installed and located so that their message can be seen at all times and at a distance which permits sufficient warning.
2. The authority having jurisdiction shall be requested to provide assistance with unusual traffic problems and to furnish special signs such as the following:
 - a. Detour and detour markings
 - b. No Parking or Limited Parking
 - c. Information and directions for the driver and/or pedestrian
 - d. Miscellaneous signs, including but not limited to:
 - i. Speed Limit
 - ii. One-Way
 - iii. Single-Lane
 - iv. Stop
3. **Sizes of Signs:** The five standardized sizes of signs and the classifications of roadways on which they are to be used are as follows:

Size Designation	Size Code	Roadways On Which Used
Minimum	1	Roadways which are neither state truck roadways nor connecting streets, which have not more than one lane for traffic in each direction and which meeting either of the following conditions:

		a. Have a speed limit of 35 mph or less; or b. Are classified as a Secondary Rural Road or Local Road
Standard	2	The smallest size that may be used on state truck roadways, connecting streets and/or other streets and roadways where minimum signs may not be used.
Oversize	3	For use on all rural state truck roadways with an Average Daily Traffic volume over 3000 vehicles and on other roadways where speed, volume, geometrics, and/or accident experience indicate that signs larger than the standard size are desirable. When a particular sign does not have an "oversize" designation use the standard size.

4. Traffic Cones

- a. Cones shall be used to further warn traffic of obstructions or excavations. Cones should be placed at intervals of approximately $\frac{1}{2}$ of the posted speed to adequately channel traffic. For example: In a 25 mph posted area the suggested distance is $\frac{1}{2}$ times 25 which equals 10-12 feet distance for cone separation.
- b. Cones are commercially available in both 42" and 28" heights and should be placed by setting the shorter one furthest from the work area and the taller ones nearest the work area.
- c. Whenever possible, trucks or other work equipment should be used as a barrier to protect open excavations, etc., providing that doing so will not cause any additional obstructions to the flow of traffic.
- d. Fencing or manhole guards may be installed or may be required in place of barricades or in addition to barricades where the situation calls for their use.

G. Additional Protective Devices, Placement on Rural Roadways

1. Cones and Drums

Where traffic volumes, speeds and visibility are such as not to require the more substantial Class I or Class II barricades, effective use can be made of cones or drums. Cones and drums should not be regarded as an alternative to rail barricades. Cones and drums should never be placed in the roadway without advance warning signs or wing barricades.

2500 NOTICE OF NEW CONSTRUCTION

2501 NOTICE OF NEW CONSTRUCTION

Notice shall be given to the Florida Public Service Commission of all major construction of new natural gas pipelines and facilities, stating the size, approximate location and proposed start and finish construction dates. This requirement shall apply for all additions that are both over 2000 feet in lengths and lines 2" and larger in diameter.

2600 DRUG AND ALCOHOL POLICY AND PROCEDURES

2601 SCOPE

This Standard sets forth basic principles and prescribes minimum standards to be following in the application of employee drug and alcohol testing in compliance with the requirements of USDOT 49 CFR Part 199, “Drug and Alcohol Testing” and Florida Administrative Code, Chapter 25-12.005 “Codes and Standards Adopted.”

It is the policy of Reedy Creek Improvement District and its agent, Reedy Creek Energy Services, Inc. that prohibited drugs and alcohol shall be not used by any person involved in the operation, maintenance, emergency response or new construction of any natural gas system under their jurisdiction. Prohibited drugs and alcohol shall be those defined in all application regulations including USDOT 49 CFR Part 199, “Drug and Alcohol Testing” and Florida Administrative Code, Chapter 25-12.005 “Codes and Standards Adopted.”

It is the objective of this policy to:

- A. Protect the public and the workforce
- B. Minimize inconvenience and economic loss
- C. Maintain public good will
- D. Protect the employee’s privacy

2602 DRUG AND ALCOHOL PROGRAM – EMPLOYEES

- A. Adopted by reference and inclusion is the “Reedy Creek Energy Services, Inc. Drug and Alcohol Testing Policy and Procedures” in the Reedy Creek Improvement District Natural Gas Department, Operation and Maintenance Procedures Manual.
- B. This document governs the testing of all direct employees of Reedy Creek Energy Services, Inc. that are involved in any aspect of the operation, construction, maintenance and emergency response functions of the covered natural gas systems.

2603 DRUG AND ALCOHOL PROGRAM – CONTRACTORS

- A. Contractors that are involved in the new construction, maintenance and repair of covered natural gas systems shall be required to have in place, prior to being allowed to bid on work, a drug and alcohol testing program in full compliance with USDOT Part 199 “Drug and Alcohol Testing” and Part 40, “Procedures for Transportation Workplace Drug Testing Programs.” The contractor’s drug and alcohol testing program shall also be in full compliance with all applicable provisions of the Florida Administrative Code, Chapter 25-12.005.

- B. Contractors are required to keep their drug testing programs in full compliance at all times in order to:
 - 1. Remain qualified to bid on work, and
 - 2. Be allowed to complete executed contracts
- C. Contractors that fail to keep their drug and alcohol testing programs in compliance shall become subject to contractual remedies that:
 - 1. Protect the Owner's interests in the completion of the work, and
 - 2. Protect the Owner's interests in remaining in compliance with all applicable regulations.
- D. The following contractor roles shall be subject to drug and alcohol testing:
 - 1. Welders
 - 2. Pipefitters
 - 3. Laborers
 - 4. Heavy equipment operators
 - 5. Cathodic protection technicians and survey personnel including cathodic protection engineering personnel involved in evaluation of contractor installed systems.
 - 6. Electricians
 - 7. Mechanics
 - 8. Painters
 - 9. Sandblasters and other coating preparation personnel
 - 10. Instrumentation technicians
 - 11. Working foremen
 - 12. Any and all other category that performs work on the pipeline, pipeline instrumentation, cathodic protection, and whose quality of work, if substandard due to drug and alcohol use, would result in an improperly constructed natural gas facility.
- E. The RCES Project Management Department shall have the authority and the responsibility to enforce the provisions of these standards.

- F. The following contractor employee positions shall not be subject to drug and alcohol testing:
1. Accountant/bookkeeper
 2. Secretary/clerical
 3. Project Manager
 4. Superintendent
 5. Executive
 6. Delivery truck driver
 7. Project Engineer
 8. CAD Operator/Designer
- G. Subcontractors performing covered work shall be governed by the same rules, regulations, and requirements as contractors. Contractors shall be responsible for insuring that subcontractors have drug and alcohol testing programs and that subcontractors submit to the owner all required documentation.
- H. Contractors shall not be allowed to use temporary or borrowed personnel to perform covered work unless those individuals have completed pre-employment testing or already be in a qualified drug and alcohol testing program.
- I. Contractors will not be permitted to “start and stop” their drug and alcohol testing programs at will and remain qualified to perform work.
- J. Appended at the end of this Standard is guideline information (Section 2604) for setting up a qualified drug and alcohol testing program.
- K. Appended in Section 2605 is a one page sample “Contractor Compliance Report” that shall be submitted to the Owner every quarter in order for contractors and subcontractors to remain on the active bid list. Alternative versions of this form may be provided to RCES to verify compliance; however, the alternative forms must contain all of the information requested on the sample “Contractor Compliance Report.”
- L. All Contractors shall be required to annually re-certify their Drug and Alcohol Program demonstrating compliance with USDOT Part 199. Contractors’ Drug and Alcohol Programs will be evaluated, at a minimum on each item listed on the evaluation form appended in Section 2606 titled “Evaluation of Contractor’s Anti-Drug Program”.

2604 CONTRACTOR DRUG AND ALCOHOL PROGRAM GUIDELINES

A. Introduction:

This program has been developed to provide guidance to the contractor and identify requirements for contractor compliance with USDOT Part 199 Drug and Alcohol Testing. The term "Company" as used shall mean Reedy Creek Energy Services, Inc. or its assigns. The term "Owner's Representatives" as used herein shall mean the individual(s) name(s) in each contract as the Owner's authorized agent for contractual matters.

B. Performance Objective: In order to provide services to the Company, a contractor must comply with all applicable federal and state of Florida regulatory requirements. The contractor shall assume full responsibility for such compliance and perform all activities identified by these performance standards.

1. Anti-Drug and Alcohol Plan: Contractors shall establish a clear drug and alcohol policy in accordance with all applicable federal and state of Florida regulatory requirements. This policy shall be at least the equivalent of the Company's Drug and Alcohol Policy. The contractor shall have a written anti-drug and alcohol plan that, at a minimum, provides:

- a. Methods and procedures for compliance with all requirements of 49 CFR, Part 199, including the employee assistance program.
- b. The name, address and telephone number of each certified laboratory selected to analyze the specimens collected for drug testing
- c. The name, address and telephone number of the Medical Review Officer
- d. All positions subject to drug testing
- e. Process and procedures for compliance with 49 CFR Part 199
- f. Positions to receive the Employee Assistance Program (EAP), and
- g. Methods of assuring confidentiality of drug test records

2. Employee Assistance Program: Contractor programs shall be provided to all employees as required by regulation. This program shall comply with but not be limited to the following:

- a. Display and distribution of informational materials
- b. Display and distribution of a community service hot-line telephone number for employee assistance, and
- c. Display and distribution of the employer's policy regarding the use of prohibited drugs

3. Supervisory Training Program: Contractor sessions for supervisor/management personnel shall be provided as required by all applicable regulations. This program shall comply with but not be limited to the following:
 - a. Recognition of contemporaneous physical, behavioral, and performance indicators of probable drug and/or alcohol use.
 - b. Appropriate intervention and referral actions
 - c. Employer's policies and procedures in handling of these matters
 - d. Clear and objective documentation

4. Drug Testing: Contractors are required to conduct the following five types of drug and alcohol testing under Part 199. All drug test analysis shall be performed by a laboratory that is certified by the Department of Health and Human Services under the DOT procedures.
 - a. Pre-Employment Testing/Pre-Assignment:
 - i. Testing must be conducted when either an individual is hired for a covered position or when a current employee is first transferred from a non-covered position, unless the individual is already subject to a Part 199 anti-drug program.
 - ii. An employee who is separated from a Part 199 anti-drug program must be pre-employment tested prior to performing a covered function.
 - b. Random Testing:
 - i. Random testing applied to all employees (full-time, part-time, temporary) who perform sensitive safety-related covered functions.
 - ii. Testing may be phased-in during the first 12 months. The total number of random tests during the first 12 months must equal at least 25 percent of the total population identified as performing sensitive safety-related covered functions. Contractors may start testing at a lower testing rate and work up to 50 percent annualized rate by the end of the first year.
 - iii. To assure that the selection process for random selection is indeed random, all personnel must be placed in a common selection pool.
 - iv. Random selection procedures shall include utilization of a random number table or a computer-based number generator that is matched with a payroll identification number or any other identifying number.

- c. Reasonable Cause Testing:
 - i. The decision to test must be based on specific contemporaneous physical, behavioral, or performance indicators of probable drug use. Contractors are encouraged to include the drug test with a medical examination.
 - ii. Two (2) supervisors must substantiate and concur in the decision to test. One of the two supervisors must have received training as required in 2604.B.3.
 - d. Post-Incident Testing:
 - i. Testing of personnel whose performance either contributed to an incident or cannot be completely discounted as a contributing factor to the incident.
 - ii. Testing must be completed as soon as possible, but no later than eight (8) hours after an incident.
 - iii. Post incident drug testing is required when an incident reportable under 49 CFR Parts 191, 192, and 195 has occurred.
 - iv. Any event that is significant in the judgement of the Contractor's supervisor should be immediately reported to RCES Project Management and discussed to determine if it is to be treated as an incident.
 - e. Post-Rehabilitation Testing:
 - i. Personnel who, based on the Medical Review Officer's recommendation, return to duty after completion of rehabilitation must be given unannounced drug tests, as scheduled by the Medical Review Officer, in addition to being subject to other types of testing for a period of up to five (5) years.
5. Company Notification:
- a. Contractors shall notify the Company in writing of any changes in their anti-drug plan following initial acceptance. This notification shall be made simultaneously to the RCES Gas Engineer and the RCES Program Manager for Project Management.
 - b. Contractors shall notify the Company of reportable incidents (as required under Parts 191, 192, and 195), referrals for reasonable cause testing, or any significant unusual events by contacting the RCES Gas Department and the RCES Program Manager for Project Management.
6. Medical Review Officer:

- a. Contractor's anti-drug plan must designate a medical review officer (MRO).
- b. The MRO shall interpret, evaluate, and monitor its drug testing program.
- c. The MRO must be a licensed physician, either a doctor of medicine or a doctor of osteopathy, knowledgeable in drug abuse disorders, and the pharmacology and toxicology of all of the prohibited drugs and alcohol shall be those defined in all applicable regulations including USDOT 49 CFR Part 199, "Drug and Alcohol Testing" and Florida Administrative Code, Chapter 25-12.005 "Codes and Standards Adopted."
- d. The MRO must review and interpret positive test results. This review shall confirm whether any alternative legitimate medical explanation should account for the positive test result. Section 199.109 and 49 CFR Part 40 lists specific duties and responsibilities of the MRO.

7. Collection and Laboratory Testing:

- a. All collections procedures must be performed in compliance with 49 CFR Part 40.
- b. Samples that yield positive results on confirmation must be retained in frozen storage by the laboratory for at least 365 days.

8. Appeals:

Contractor programs shall provide for review and appeal in accordance with all applicable regulations. This includes, but is not limited to, the following provisions:

- a. The employee may make a request for the retesting of the original sample within 60 days of receipt of results from the MRO.
- b. If the employee specifies retesting by a second approved laboratory, the original laboratory must follow the approved chain of custody procedures in transferring a portion of the sample.
- c. Reanalysis of a sample need only corroborate the presence of an analyte within the established sensitivity of the assay, as technically appropriate.

9. Recordkeeping and Reporting:

Each Contractor shall maintain the following records for the periods specified:

- a. Records confirming that employees and supervisors have received education and training, must be maintained for at least three (3) years.

- b. Records that demonstrate compliance of the collection process must be maintained for at least three (3) years.
- c. Records of employee drug testing results that show employees passed a drug test must be maintained for at least one (1) year.
- d. Records of employee drug test results that show employees failed a drug test, the type of testing and records that demonstrate rehabilitation, if any, must be maintained for a minimum of five (5) years.
- e. Records of the number of employees performing covered functions, the number of tests by type and the number of employees tested must be maintained for five (5) years.
- f. Contractors shall complete the Compliance report and submit on a quarterly schedule.

Quarter	Period	Deadline
1 st	January- March	April 30 th
2 nd	April – June	July 30 th
3 rd	July –September	October 30 th
4 th	October – December	January 30 th

10. Audits:

Contractors will allow access to property and records by Reedy Creek Energy Services, Inc. or its assigns, United States Department of Transportation, and the Florida Public Service Commission.

11. Confidentiality:

- a. The Contractor program shall carefully consider the employee's expectations of privacy and confidentiality.
- b. Contractors shall provide security for all records.
- c. Unless an employee gives his or her written consent a Contractor may not release the employee's rehabilitation or drug test records to a subsequent employer.

2605 CONTRACTOR COMPLIANCE REPORT

CONTRACTOR COMPLIANCE REPORT

CONTRACTOR NAME _____

ADDRESS _____

Contact Person _____ Phone No. _____

1. Total number of employees in this organization _____

2. Total number of employees in the test pool by type:

_____ Full Time _____ Temporary
 _____ Part Time Others (Explain) _____

3. Report the number of tests, employee tested, and positive results for each category listed:

	<u>Tests</u>	<u>Employees Tested</u>	<u>Positive Results</u>	<u>THC</u>	<u>Cocaine</u>	<u>PCP</u>	<u>Opiates</u>	<u>Amphetamines</u>	<u>Other</u>
a. Pre-Employment/ Pre-Assignment	_____	_____	_____	_____	_____	_____	_____	_____	_____
b. Random	_____	_____	_____	_____	_____	_____	_____	_____	_____
c. Reasonable Cause	_____	_____	_____	_____	_____	_____	_____	_____	_____
d. Post Incident	_____	_____	_____	_____	_____	_____	_____	_____	_____
e. Post Rehabilitation	_____	_____	_____	_____	_____	_____	_____	_____	_____

4. Report the following information on all employees with positive results, on reverse side

Submit Form To: Dennis Martin
 Project Management
 Reedy Creeek Energy Services, Inc.

Submitted By: _____

Period Covered: _____

Date Submitted: _____

CONTRACTOR COMPLIANCE REPORT

<u>Age</u>	<u>Sex</u>	<u>Type of Test</u>	<u>Substances Found</u>	<u>Disposition</u>
TEST				DISPOSITION
PE	Pre-employment	RC	Reasonable Cause	Comments shall reflect the status of the individual at the end of the reporting quarter. (e.g. transferred to non-covered position, termination, rehabilitation, leave without pay, etc.)
PA	Pre-Assignment ¹	PI	Post Incident	
RD	Random	PR	Post Rehabilitation	
¹ Employee must be on the payroll at the time of testing.				

2606 EVALUATION OF CONTRACTOR'S DRUG AND ALCOHOL PROGRAM

		S	U	N/A	Comments
199.115 & 49 CFR Part 40	<p>TITLE 49, CODE OF FEDERAL REGULATION, PART 199</p> <p>CONTRACTOR EMPLOYEES</p> <p>Does contract with operator provide that the drug testing, education and training of covered employees required by 49 CFR Part 199 be carried out by contractor?</p> <p>(Contractors are responsible for subcontracted employees. Recommend a review of contracts.)</p> <p>Does the contract permit the operator to have access to the property and records of the contractor?</p> <p>Does the contract permit access by FPSC and any applicable state and local agency to the contractor's property and records for the purpose of monitoring the contractor's compliance?</p> <p>Does the contract provide penalties for failure to comply with 49 CFR Parts 199 and 40?</p>				
199.101. 199.113. 49 CFR Part 40, & FAC 25-12.005	<p>ANTI-DRUG PLAN</p> <p>1. Does the contractor maintain and follow a written anti-drug plan that conforms to all applicable regulations?</p> <p>(Is there a copy on file with the operator? If not, a copy should be obtained?)</p> <p>2. Does the plan contain:</p> <p>a. Methods and procedures for compliance with all requirements of 49 CFR Part 199 and 40, including an employee assistance program (EAP)?</p> <p>b. The name and address of each laboratory that analyzes the specimens collected for drug testing?</p> <p>c. The name and address of the contractor's</p>				

	medical review officer (MRO)?				
199.101. 199.113. 49 CFR Part 40, & FAC 25-12.005	<p>ANTI-DRUG PLAN cont.</p> <p>d. All positions subject to drug testing? (Positions should match those specified in the operator's plan. Evaluator may choose to randomly visit site locations to verify employee's status.)</p> <p>e. Methods and procedure for compliance with 40 CFR Part 40?</p> <p>f. Positions which are to receive EAP training?</p> <p>g. Responsibilities of the MRO?</p> <p>h. Persons responsible for record keeping?</p> <p>i. Procedures for notifying employees of coverage?</p> <p>j. Methods of providing confidentiality of drug test records?</p>				
199.103	<p>USE OF PERSONS WHO FAIL OR REFUSE A DRUG TEST</p> <p>Does the contractor's anti-drug plan provide that a person cannot be used in a covered position if that person:</p> <p>1. Fails a drug test required by 199.105 and the MRO determines that there is no legitimate medical explanation for the confirmed positive test other than unauthorized use of a prohibited drug unless the person has:</p> <p>a. Passed a drug test?</p> <p>b. Been recommended by the MRO for return to duty?</p> <p>c. Not failed a drug test after returning to duty.</p> <p>2. Refuses to take a drug test required by 199.105?</p>				

199.105	<p>TYPE OF DRUG TESTS REQUIRED</p> <p>Does the contractor conduct the following drug tests for the presence of a prohibited drug? (Evaluators should review periodic reports provided by the contractor for the previous year.)</p> <ol style="list-style-type: none"> 1. Pre-employment/pre-assignment testing? 2. Post-incident testing? 3. Random testing? 4. Testing based on reasonable cause? 5. Return to duty testing? 				
199.107	<p>DRUG TESTING LABORATORY</p> <p>For drug testing required by 49 CFR Part 199, does the contractor use only those drug testing laboratories certified by the Department of Health and Human Services under the DOT procedures.</p> <p>Name of Laboratory: _____</p>				
199.109	<p>REVIEW OF DRUG TEST RESULTS</p> <p>(Evaluator may choose to interview the contractor's MRO)</p> <ol style="list-style-type: none"> 1. Has the contractor designated a medical review officer (MRO)? 2. Is the MRO a licensed physician and is knowledgeable of drug abuse disorders? 3. Does the MRO perform the following functions? <ol style="list-style-type: none"> a. Review of drug testing results before they are reported to the contractor? b. Review and interpret positive test results as follows to determine if there is an alternate medical explanation for the confirmed positive results: <ol style="list-style-type: none"> i. Provide opportunity for an interview for an employee who tests positive? 				

<p>199.109</p>	<p>REVIEW OF DRUG TEST RESULTS cont.</p> <ul style="list-style-type: none"> i. Review the individual's medical history and any relevant biomedical factors? ii. Review all medical records made available by the individual tested to determine is a confirmed positive test resulted from legally prescribed medicine? iii. If necessary require that the original specimen be reanalyzed to determine the accuracy of the reported test result. iv. Verify that the laboratory report and assessment are correct? <p>c. Determine whether and when an employee involved in rehabilitation may be returned to duty after rehabilitation?</p> <p>d. Determine the schedule of unannounced testing, in conjunction with the rehabilitation committee, for an employee who has returned to duty after rehabilitation?</p> <p>e. Verify that an employee has been tested in accordance with DOT procedures before the employee returns to duty after rehabilitation.</p> <p>4. Does the MRO use the following rules when making decisions:</p> <ul style="list-style-type: none"> a. If there is a legitimate medical reason for a confirmed positive test, the MRO takes no action? b. If there is no legitimate medical reason for a confirmed positive test, the MRO refers the individual to an employee assistance program, a personnel officer, or an administrative officer for action in accordance with the contractor's anti-drug program. 				
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199.109	<p>REVIEW OF DRUG TEST RESULTS cont.</p> <p>c. Based on the available data, including other test results, may conclude a particular drug test is insufficient for further action and should conclude that test is negative for that individual?</p>				
199.111	<p>RETENTION OF SAMPLES AND TESTING</p> <p>(Evaluator may choose to contract the contractor's laboratory to respond to the following.)</p> <p>1. Does the laboratory retain sampled that yield confirmed positive results for one year in secured frozen storage?</p> <p>NOTE: The laboratory may be requested to retain sample for an additional reasonable period; however, if no written request is received during the one-year period the sample may be discarded at the end of one year.</p> <p>(Contractor may specify conformance to 49 CFR Part 40 or 199.)</p> <p>2. If the MRO determines that there is no legitimate medical reason for a confirmed positive test result, do the procedures permit the employee to submit a written request for a retest within 365 days of receipt of the final test results from the MRO?</p> <p>a. Does the contractor submit a retest of the original specimen?</p> <p>b. Does the contractor require the employee to pay the associated retest costs in advance?</p> <p>c. Is the employee reimbursed if the retest is negative?</p> <p>3. If the employee requests retesting by a second laboratory, does the original laboratory follow approved custody transfer procedures?</p> <p>(All testing must be performed by an approved HHS laboratory.)</p>				

	<p>4. Does the contractor's procedures make allowances for the possibility that some analytes may deteriorate during storage, the results of a retest are to be reported as confirmation of the original test results if the detected levels of the analyte are below the DOT established limited and are equal to or greater than the sensitivity of the test.</p>				
199.113	<p>EMPLOYEE ASSISTANCE PROGRAM (EAP)</p> <p>1. Does the contractor provide EAP for its employees and supervisory personnel?</p> <p>a. Does the EAP include education and training about drug use?</p> <p>b. Does the contractor, as part of the EAP, display and distribute:</p> <p>i. Informational material?</p> <p>ii. Community service hot-line telephone numbers for employee assistance?</p> <p>iii. The employer's policy regarding the use of prohibited drugs?</p> <p>iv. Does the contractor provide a 60 minute period of training for supervisory personnel which teaches the specific contemporaneous physical, behavioral, and indicators of probable drug use?</p>				
199.117	<p>RECORD KEEPING</p> <p>Does the contractor keep the following records of the drug testing program for the periods of time required?</p> <p>1. Records to be kept for a minimum of 1 year:</p> <p>a. Records showing an employee passed a drug test?</p>				

199.117	<p>RECORD KEEPING cont.</p> <p>2. Records to be kept for a minimum of 3 years:</p> <ul style="list-style-type: none"> a. Records demonstrating that the collection process conforms to 49 CFR part 40? (Review of collection procedures) b. Records confirming that supervisors have been trained as required by 199.105 and 199.113? (Review training dates and attendance rosters) c. Proof of education/awareness provided for employees? (Review education awareness records) <p>3. Records to be kept for a minimum of 5 years:</p> <ul style="list-style-type: none"> a. A record of the number of employees tested by type of test. (e.g. post-incident test) b. Records that document than an employee failed a drug test, the type of test failed (e.g. post-incident test) and records that demonstrate rehabilitation, if any. Records must include the following information: <ul style="list-style-type: none"> i. Type of test failed ii. Records that demonstrate rehabilitation, if any iii. The functions performed by an employee who failed a drug test iv. The prohibited drugs that were used by the employee who failed the drug test v. The age of each employee who failed a drug test vi. The disposition of each employee who failed a drug test (e.g. termination, rehabilitation, leave without pay, etc.) 				
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