

IV. WATER AND SEWER UTILITIES

A. Sanitary Sewer Collection

1. General

Any new wastewater generator constructed within the City of Milton within 200 feet of the City's wastewater collection system shall connect to the public sewer. All new wastewater collection systems shall be designed and constructed in strict accordance with FAC Chapter 62-604. Each new connection shall be designed using a single 4" service unless otherwise arranged. No construction activity shall commence until all appropriate permits have been received from the Florida Department of Environmental Protection.

2. Design Flow

New collection systems shall be designed on the basis of an average daily per capita sewage flow of not less than 100 gallons per capita per day and meet Ten State Standards design criteria. The average daily per capita sewage flow shall be adjusted by a "peaking factor" as determined by Ten State Standards.

In addition to the basis of design provided above, consideration of unusually high commercial or industrial contributions shall be incorporated in to the design flow.

3. Gravity Sanitary Considerations

a. General Design Considerations

(1) Minimum Size

No gravity sewer main conveying raw sewage shall be less than eight inches (8") in diameter. An exception to this is service laterals connecting single units to the public sewer. A four (4") clean out to be installed at each property line or on all services constructed by the contractor.

(2) Slope

All sewers shall be laid with uniform slope between manholes. Sewers shall be designed and constructed to give mean velocities, when flowing full, of not less than 2.0 feet per second, based on Kutter's formula using an "n" value of 0.013. Table IV-1 depicts the minimum slopes, which should be provided; however, slopes greater than these are desirable.

(3) Alignment

Sewers 24 inches or less in diameter shall be laid with straight alignment between manholes. The alignment shall be checked by using a laser beam. The maximum length between manholes shall be 400 feet.

(4) Changes in Pipe Size

When a smaller sewer joins a larger one, the invert of the larger sewer should be lowered sufficiently, but not less than 0.10 inches (one tenth) to maintain the same energy gradient.

(5) Materials

All materials shall be free from defects impairing strength and durability and be of the best commercial quality for the purpose specified. It shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

a. Unplasticized Polyvinyl Chloride (PVC)

PVC gravity sewer pipe and fittings shall be unplasticized polyvinyl chloride meeting or exceeding ASTM Specifications D3034.

Pipe lengths shall not exceed 20 feet and provisions shall be made at each joint to accommodate expansion and contraction.

Minimum wall thickness shall be:

Diameter	4"	6"	8"	10"	12"	15"
Wall Thickness	.125"	.180"	.240"	.300"	.360"	.437"

Providing a maximum SDR ratio of 35 and a minimum "pipe stiffness" (F/Y) = 46 at five percent deflection when tested in accordance with ASTM D2412, external loading properties of plastic pipe by paneled plate loads.

All pipe and fittings shall be jointed by means of an integral wall bell and spigot joint and sealed with a rubber ring. The pipe and fittings shall be shipped to the job with a solid cross section rubber-sealing ring securely locked in place in the bell. The bell shall consist of an integral wall section of pipe formed into shape and stiffened with two PVC retainer rings, which securely lock and the rubber ring in place. The joint shall be capable of withstanding an internal hydrostatic pressure of 25 psi for one hour with no leakage.

In every instance where pipe enters or leaves a manhole, a fitting shall be provided which will accommodate expansion and contraction of the pipe; release strain on the pipe caused by differential settlement between pipe and manhole; and provide a rubber ring water seal between pipe and manhole.

Each length of pipe shall be clearly marked with the following information at intervals of five feet or less:

- i) Manufacturer's name or trademark
- ii) Normal pipe size
- iii) ASTM specification
- iv) National sanitation approval

b. Ductile Iron Pipe

Ductile iron pipe shall meet the requirements of ANSI A21.51, including Addenda A21.51 a. Pipe dimensions shall conform to Federal Specification WW-P-421, class 150. Each pipe shall be conspicuously marked on the outside of the barrel to readily identify it from Cast-Iron. Metal thickness shall conform to ANSI A21.51, Table 51.1, two and one half to five feet cover.

- i) Mechanical Joints: A N S I Standard Specification A21.11, Rubber Gasket Joints for Cast-Iron Pressure Pipe and Fittings.
- ii) Push-on Joints: ANSI Standard Specification A21.11, Rubber Gasket Joints for Cast-Iron Pressure Pipe and Fittings, Single gasket push-on type.
- iii) Flanged Joints: ANSI Standard Specification B16.1, Cast-Iron Pipe Flanges and Flanged Fittings, 125 pounds. Screwed on flanges, faced and drilled to ANSI Class 125 pounds template. The flanged joints shall be assembled by threading plain end pipe and screwing on long hub flanges. The connection shall then be power tightened and refaced across both face of flange and end of pipe. Provide one-sixteenth-inch ring gaskets of red sheet rubber meeting the requirements of Grade I, Table I of ASTM Specification D1330-66, Sheet Rubber Gaskets. Connections shall be made with machine bolts and hexagonal nuts.
- iv) Fittings: Fittings shall meet ANSI Standard Specification A21.10, latest, Cast Iron Fittings, two inch through 48-inch for Water and Other Liquids. Minimum pressure rating shall be equivalent to that of the pipe specified.

c. Coatings for Ductile Iron Pipe

All ductile iron pipe and fittings to convey wastewater shall be lined with PROTECTO 401 CERAMIC EPOXY LINING and the exterior coated with bituminous material in accordance with A21.6. The

exterior of all above ground pipe shall receive a coat of rust inhibitor prime compatible with the finish paint schedule. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal-tar prior to backfilling. In lieu of the above coating, "H2 sewer safe" as manufactured by Griffin Pipe Products Co. may be used.

4. Manholes

Unless otherwise shown on the drawings, manholes shall have an inside diameter of four feet. If the manhole depth equals or exceeds five feet, it shall have an eccentric cone section that narrows to two feet in diameter at the top. Manholes shall be installed at all changes in sewer alignment, grade, and pipe diameter, at junctions of two or more sewers, at the upstream end of a sewer and at intervals not to exceed 400 feet. Sewer sloping in opposite directions shall not use a single manhole as a common terminus.

a. Precast Concrete Manholes

All manholes shall be of precast concrete construction and shall meet the requirements of ASTM C478, (Latest Edition), except as modified herein. The concrete used shall be Type II or approved equivalent with a 28-day strength of 4000 pounds per square inch.

The vertical walls shall have a minimum thickness of five-inches per linear foot. The flat tops on shorter manholes shall be reinforced with No. 6 bars on six-inch center both ways or as shown on the drawings.

The inside diameter shall be 48 inches on the riser sections with an eccentric cone section that narrows to 24 inches inside diameter at the top. The cone section shall be used on manholes with a depth of five feet or more and flat top used on manholes less than five feet.

The bottom section shall be of monolithic design with a minimum bottom thickness of six inches.

The joints between the sections shall be tongue and groove down and shall be sealed with round or other flexible type natural rubber joint rings. In addition to the

rubber ring gaskets, the interior and exterior voids in the pipe joints shall be sealed with “RAM-NEK” flexible plastic gasket manufactured by K.T. Snyder Company. “RAM-NEK” shall be installed in strict accordance with the manufacturer’s recommendations.

b. Manhole Accessories

The manhole frames and covers shall be Vulcan Foundry No. VM-37, Neenah Foundry No. R-1600 series or equivalent. Solid covers shall be marked “SEWER”. Frames for the covers shall be set to grade in a bed of cement mortar. Frames and covers shall be machined or ground at bearing surfaces to seat firmly and prevent rocking. Any set not matching perfectly shall be removed and replaced at no additional cost. Manholes greater than 4’ in depth will be furnished with steps.

c. Protective Coatings

The entire exterior and interior surfaces of all manholes shall be coated with a minimum of 12 mils dry film thickness of Pro Standard (Pro Tech Coatings, Inc.) or approved equivalent bituminous coating. For precast manholes, this coating shall be applied at the plant and shall be completely cured when delivered. Surface preparation and curing time for the plaster coat on manholes prior to applying the coatings shall be in accordance with the manufacturer’s recommendations.

d. Manholes

All new manholes that are to receive a force main connection shall be constructed using the HDPE liner as specified in the lift station section or be of approved fiber glass. All existing manholes that are to receive a force main connection shall be coated on the interior using Strong-Seal™ Sewer Coat™ or equal.

e. Manhole Invert Channels

The manhole invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the connecting sewer section. Invert channels and manhole bottoms shall be shaped and smoothed with one to two (1:2) cement-sand mortar of still consistency.

Changes in size and grade shall be made gradually and evenly.

5. Sanitary Sewer Lift Stations

The installation shall comply with all local, state and federal laws and ordinance applicable to electrical installation and with the regulations of the latest edition of the published National Electrical Code where such regulations do not conflict with those laws and ordinances. The Contractor shall obtain all permits, and after completion of the work, shall furnish the Engineer a certificate of final inspection and approval from the applicable local inspection departments.

Construction drawings submitted to the City for review shall be accompanied by three (3) sets of design calculations. The design shall be in strict accordance with Florida Department of Environmental Protection Chapter 62-604, and shall specifically incorporate the following features:

- The lift station design shall prevent the introduction of stormwater runoff into the sanitary sewer system.
- Lift stations shall be designed with a standard receptacle for connecting portable power generating equipment and a riser, with appropriate coupling device and valving to the discharge pipe to connect portable pumps. The receptacle shall be a Killark # WRJL1004.
- Pumping stations shall be protected from lightning and transient voltage surges. As a minimum, stations shall be equipped with lightning arresters, surge capacitors, or other similar protective devices and surge protection.
- New lift stations shall be located to minimize adverse effects resulting from odors, noise, and lighting.
- New lift stations shall be enclosed inside a security fence as specified in Section III-5.6 of the City's Land Development Regulations.
- New lift stations shall be designed to resist flotation in totally saturated soils.

At completion of the work, three (3) copies of written operation and maintenance manuals and certified pump curves shall be furnished to the Design Engineer for certification. The Design Engineer shall forward the operation, maintenance manuals and pump curves, along with his certification to the Water and Sewer Director.

The lift station shall include a minimum of two (2) submersible pumps, four (4) mercury switch level controls, discharge pipes with check valves. A NEMA 3R weatherproof panel 304 stainless steel shall be supplied for mounting at the lift station site

a. Wet Well and Valve Box

(1) Precast Wet Well:

The lift station wet well shall be a minimum of 6’ diameter and shall be of precast concrete construction meeting the requirements of ASTM C 478, (latest edition), or of fiber glass construction meeting the requirements of ASTM D3753-99 except as modified herein. The concrete used shall be Type II or approved equivalent with a 28-day strength of 4000 lbs. per square inch.

The vertical walls shall have a minimum thickness as indicated below and shall be reinforced with a minimum of 0.12 square inches of steel per linear foot.

<u>Wall Diameter</u>	<u>Min. Wall Thickness</u>
72”	7 ¾”
96”	9 ¾”

The bottom section shall be of monolithic design with a minimum bottom thickness of 18 inches and shall be reinforced as shown in the construction plans.

The joints between the sections shall be tongue and groove with the tongue up and the groove down and shall be sealed with round or other flexible type natural rubber joint rings. In addition to the rubber ring gaskets, the interior and exterior voids in the pipe joints shall be sealed with “RAM-NEK” flexible plastic gasket manufactured by K.T. Snyder Company. “RAM-

NEK” shall be installed in strict accordance with the manufacturer’s recommendations.

(2) Wet Well Accessories

Access hatches shall be provided allowing easy access for pump installation / removal and float maintenance. All wet well hardware and accessories shall be aluminum or stainless steel.

(3) Valve Box

The valve box is to be of masonry or concrete construction or of fiber glass construction meeting the requirements of ASTM D3753-99 and equipped with an aluminum access hatch, allowing easy access to all valves and fittings.

(4) Protective Coatings

The entire exterior surface (below grade) of the wet well and valve box shall be coated with a minimum of 12 mils dry film thickness with Pro Standard (ProTech Coatings, Inc.), or approved equivalent bituminous coating. Surface preparation and curing time for the coatings shall be in accordance with the manufacturer’s recommendations. The entire interior concrete walls and under side of the concrete top shall receive an HDPE/Polyethylene or Polyethylene liner. The liner shall be integrated cast into the structure and shall be a minimum of 2.0 mm thick. All joints shall be heat fused to ensure watertight construction. The stud pullout resistance and hydrostatic backpressure resistance shall be 6000 p.s.f. each (min.). The liner shall provide adequate flexibility to bridge a ¼” joint deflection without liner damage. All liner materials and concrete mixes shall be approved by the City or its engineer prior to construction.

b. Motors

Motors shall be NEMA design B for continuous duty, capable of sustaining a minimum of ten (10) starts per hour. The pump and motor shall be produced by the same manufacturer. Pump motors shall be Heavy Duty, 3 phase 60 cycle submersible electric explosion proof motors. Installation shall be in accordance with Manufacturer’s recommendations. Pumps shall have non-clog type impellers, statically and dynamically balanced and shall be capable of passing three (3) inch diameter

spheres. Motor shall be amply rated for the condition of use. Pumps shall be ABS, Fairbanks Morse, Homa, Hydromatic, KSB, or Davis/EMU.

c. Material

Pump and motor housings to be of high quality cast iron. All major pump, motor and impeller castings to be minimum ASTM A48 Class 35B cast iron. All fasteners to be of 18-8 stainless steel. 316 stainless steel guide rails shall also be provided.

d. Sump Level Controls

Sealed float type mercury switches shall be supplied to control sump level and alarm signal. The mercury tube switches shall be sealed in a solid polyurethane float for corrosion and shock resistance. The support wire shall have heavy Neoprene jacket and a weight shall be attached to cord above the float to hold switch in place in sump. Weight shall be above the float to prevent sharp bends in the cord when the float operates under water. The float switches shall hang in the sump supported only by the cord.

e. Alarm

A high water alarm shall be supplied. Alarm flashing light, to be supplied in separate NEMA 3R (stainless steel or fiberglass) enclosure for mounting at the control box. Alarm light shall glow bright and flash under alarm conditions.

f. Operation of System

On sump level rise, lower mercury switch shall first be energized, then upper level switch shall next energize and start lead pump. With lead pump operating, sump level shall lower to low switch turn-off setting and pump shall stop. Alternating relay shall index on stopping of pump so that lag pump will start on next operation. If sump level continues to rise when lead pump is operating, override switch shall energize and start lag pump. Both lead and lag pump shall operate together until low-level switch turns off both pumps. If level continues to rise when both pumps are operating, alarm switch shall energize and signal the alarm. If one pump should fail for any reason, the second pump shall operate on the override control, alarm shall

signal. All level switches shall be adjustable for level setting, from the surface.

g. Electrical Control Panel

Control panel shall be NEMA 3R stainless steel, dead front type enclosure. A locking hasp shall be provided on door handle. A protected fluorescent light shall be installed in panel with an automatic on/off switch that controls the light when door is opened and closed. A duplex receptacle shall be installed for an accessory power outlet. The receptacle and light are to be on a separate 20 amp. breaker. If a generator is required for the installation the battery charger shall be connected to a separate 20 amp. breaker and the block heater be on a separate 20 amp. breaker. The control system shall consist of an Allen Bradley P.L.C. (Programmable Logic Controller) based system which will control the timing of operation, pump alternation, alarm and control functions *via an RS232 interface to a Omnex DX-900MA radio modem with internal I/O used for loss of ac power, communication, and analog current devices*. Other components of the system shall include an auto dialer for emergency notification of station failure, a secondary surge arrester located in the interior of panel, two (2) Allen Bradley circuit breakers, two (2) Allen Bradley starters, with “SMART” overload protection (any pump with a ten 10 horse power or greater will require Allen Bradley soft start starters, power disconnect switch, two (2) elapsed time meters, two (2) Allen Bradley hand / off / auto selector switches, run indication lights and one (1) flashing warning light mounted on the side of the panel, and higher than the fence but not directly on the panel. Mount by use of extensions, elbows, and appropriate fittings. The warning light shall also have a moisture / water relief valve mounted to the extension at elbow for removal of moisture in globe, if needed. Two (2) Seal failure warning lights shall also be installed. An Altronix battery backup system for the radio will also be located inside the panel. All major panel components shall be DIN rail mounted, allowing for quick disconnect replacement of components. A Killark #WRJL1004 generator receptacle shall be provided, so that power can be transferred from main power to generator power. Mounting brackets and back bracing for mounting control panel shall be unistrut aluminum with aluminum or stainless steel posts for support. All wiring diagrams and programs shall be included with a

quantity of four (4) operation manuals with vendor equipment verification and list.

1. Allen Bradley P.L.C. Model 1761L16AWA Micro
2. Allen Bradley w/ SMART overload starters
3. Allen Bradley CB36200 – Circuit Breaker (or Allen Bradley equivalent as per a certain application needed).
4. Allen Bradley 1492-W4 Terminal Blocks
5. Allen Bradley 194-R – Main Disconnect on/off w/ 94E/194E-A
6. Allen Bradley 1492-H5 – Terminal w/quick fuse
7. 2-outlet receptacle
8. Allen Bradley 800T – Hand/off/auto switch
9. Red Lion CUB3T100 – Digital Timers
10. Killark WRJL1004 generator plug
11. Fluorescent light with auto on/off switch
12. Hoffman A24H3008SSLP enclosure
13. Transfer switch – Allen Bradley 194E-E003153
14. Surge Suppressor – Citel DS-210D-120
15. Allen Bradley run and seal failure warning lights model # bulletin 800T
16. Altronix A1624 w / 12vdc 7 AH battery
17. RAB VP100DG red flashing light

h. SCADA

The PLC and Radio modem will be programmed to provide the following information and controls to / from the central computer system.

- a. Loss of power or phase
- b. Pump status (on/off)
- c. Pump control (on/off)
- d. High level alarm
- e. Low level alarm
- f. Power status (generator/normal)
- g. Intruder status
- h. Pump seal failure
- i. Radio power value
- j. Radio signal strength level

i. Pump Specifications

The pump(s) shall be capable of handling raw unscreened sewage, stormwater, and other similar solids-laden fluids

without clogging. The preferred (but not limited to), suction inlet shall have a wave form with the leading edge of the impeller overlapping the wave form. Should a textile or plastic sheet or other debris plug the inlet, the shearing action of the leading edge of the impeller against the wave form of the inlet will cut away enough of the material to the discharge connection (others are accepted upon the City's approval). The impeller shall be made of erosion-resistant, chilled gray or equal cast iron and shall be of the nonclogging, dynamically balanced type capable of passing a minimum of a 3" inch diameter spherical solids. The impeller shall have an optional impeller wear ring installed. The impeller shall have a slip fit and drive key fastener to the shaft and fastened by a stainless steel bolt. The pump(s) discharge and suction size shall be a minimum of 4" inch in diameter. The pump(s) volute shall be made of Class 35B or higher gray cast iron with smooth internal surfaces and all passageways free of any obstructions, rough spots or flashing. The volute shall have also a centerline discharge, unless otherwise approved by the City of Milton.

j. Motor and Pump Accessories

Each pump shall be equipped with a tandem, double mechanical seal. Both the lower stationary seals face and rotating seal face shall be made of silicone carbide or tungsten carbide while the upper stationary seal shall be sealed with an O-ring. The positively driven faces shall be held in place by individual independent springs. The seals shall require neither routine maintenance nor adjustment and shall not be damaged when the pump is run dry. When required seal oil inspection shall be achieved without disassembly of the pump. The seal shall not require the pumps liquid as a lubricant. The lower seal shall include a protective cup to prevent solids or stringy material to build up or lodge into the seal spring. Moisture sensing probes shall be used for detecting the presence of water past the seals and provide a warning of first seal failure by closing an electrical circuit and energizing a warning light on the face of the control panel. The pump shaft shall be made of AISI 430F stainless steel supported by a heavy duty lower double row ball bearing and an upper sealed single row ball bearing and bearings suitable for L bearing life of 50,000 hours. The pump motor shall be a NEMA design B suitable for continuous duty with moisture resistant class F insulation rated for 155 degree F. Each motor shall contain a Temperature monitor to provide overheating protection and shall shut the pump down should any of the monitors detect a high temperature. The monitors

shall automatically reset once the starter temp. returns to normal. The motor(s) shall be FM approved for class I division I, group C and D explosion proof, hazardous locations as defined by the National Electric Code. Lifting lugs shall be supplied on the motor, sufficient to carry the load of the motor, pump, cable and pull-up attachment. Power cables shall be a minimum as required to extend from the motor housing to the control panel as shown by design drawings. The cable shall be of the ozoflex or SO Type construction suitable for submersion in sewage. Strain reliefs shall be provided at each cable entry into the pump. All mating surfaces of the pump and motor shall be machined and fitted with O-rings where water tight sealing is required. Sealing shall be accomplished by the proper fitting of parts and not by compression or special torque requirements. All external screws and fasteners shall be made of stainless steel. All surfaces coming into contact with the liquid media, other than stainless steel, shall be protected by a corrosion resistant coating. The pump(s) shall automatically connect to the discharge connection(s) (base / elbow) when lowered into place on a stainless steel, single or double rail, guide rail system (or otherwise approved by the city) requiring no bolts, nuts or fasteners to effect proper sealing. Each system shall be supported at the top by a stainless steel upper guide bracket and at the bottom by the discharge connection. Rail lengths greater than 20 feet, shall include a stainless steel intermediate rail guide bracket. The guide rail base, on a single rail unit, shall be equipped with a vertical straightening vane, which properly aligns the slot in the pump bracket and centers the pump just prior to final seating. Easy and quick removal of pumps from other than the vertical direction over the center of the pumps shall be a requirement of the system unless otherwise approved by the City. The units shall be removable for service or maintenance without requiring entry into the sump / wet well area in order to remove or reinstall the pumps. The floats shall be of the mercury type. Floats shall be polypropylene, chemical resistant casing to form a watertight and impact resistant unit. Floats shall be Type SO for suspended use and also be weighted. The support rod/bracket shall be stainless steel with stainless steel hardware. The wet well diameter shall be a minimum of six (6) feet. Smaller diameters shall not be accepted in "new" construction. Pre-existing smaller diameters will be reviewed before final acceptance. All wet-well / sumps shall be pre-cast with a pre-cast lid with an aluminum hatch for visual inspection of the well and removal of equipment. The lid shall also have an air vent (free venting) for air/vapor release. The vent shall be constructed as to have no debris or rainwater to enter the vent,

causing venting blockage or infiltration. The vent shall be constructed of aluminum.

k. Quality Assurance

The pumps are to be engineered and manufactured under a written quality assurance program. The program is to be in affect for at least five (5) years, to also include a written record of periodic internal and external audits to confirm compliance with UL quality assurance specifications. A minimum of a five (5) year warranty on all pumps and parts will only be acceptable.

Acceptable Pump Manufacturers

1. Fairbanks Morse
2. A.B.S. Pumps
3. Davis EMU
4. Hydromatic
5. KSB Pumps
6. HOMA Pumps

Note: City reserves the right to accept or reject any or all pumps.

l. Valves and Piping

A non-clog check valve or approved equivalent shall be provided in the discharge piping of each pump to prevent backflow. A plug valve shall be installed immediately downstream of the check valve and a Dresser or other adjustable coupling shall be installed to facilitate maintenance. All piping associated with wet well and valve box to be ductile iron with flanged fittings, stainless steel fabricated, or welded.

m. Generators

Any subdivision with over 20 homes shall be required to supply an appropriately sized generator for the liftstation. The size and fuel source are to be approved by the City of Milton.

6. Pressure Piping For Wastewater

a. Sewage Lift Station Force Mains

Design velocity shall not be less than 2.0 fps. and shall have air release valves installed at all high points in force mains.

b. Materials

All materials shall be free from defects impairing strength and durability and be of the best commercial quality for the purpose specified. It shall have structural properties sufficient to safely sustain or withstand strains and stresses to which it is normally subjected and be true to detail.

c. Unplasticized Polyvinyl Chloride (PVC) Pressure Pipe

PVC pressure pipe shall have a bell-type joint designed for conveying potable water under pressure. Ring-type neoprene gasket shall be provided in recesses in the bells to make the joints watertight for all slip joint piping. Only where specifically called for on the construction plans, shall solvent-weld or flanged connections be used. All fittings shall be of the same joint design as recommended by the manufacturer. ***All PVC pipe to have 12-gage tracer wire.*** PVC pipe shall meet or exceed the minimum requirements of Commercial Standard C-900 AWWA SDR 25. PVC pipe 3" or less in diameter shall be C-200 SDR 21. All sewer force main pipe shall be green in color. Alternately the pipe shall be marked with three green stripes (1/2" inch in width) with permanent ink along its entire length with 3/4" inch letters every 21 inches along each stripe designating "Sewer".

All fittings for PVC pressure pipe shall be ductile iron mechanical joint meeting the requirements of ANSI / AWWA C153 / A211.53-84 ductile iron compact fittings 3-inch through 12-inch for water and other liquids. ***All fittings to be meg-a-lug.***

d. Ductile Iron Pipe

Ductile iron pipe shall meet the requirements of ANSI A21.51, including Addenda A21.51a. Pipe dimensions shall conform to Federal Specification WW-P-421, Class 150. Each pipe shall be conspicuously marked on the outside of the barrel to readily identify it from Cast-Iron. Metal thickness shall conform to ANSI A21.51, Table 51.1, 2-1/2 to 5 feet cover.

(1) Mechanical Joints

ANSI Standard Specification A21.11, Rubber Gasket Joints for Cast-Iron Pressure Pipe and Fittings.

(2) Push-On Joints

ANSI Standard Specification A21.11, Rubber Gasket Joints for Cast-Iron Pressure Pipe and Fittings, Single gasket push-on type.

(3) Flanged Joints

ANSI Standard Specifications B16.1, Cast-Iron Pipe Flanges and Flanged Fittings, 125 pounds. Screwed on flanges, faced and drilled to ANSI Class 125 pound template. The flanged joints shall be assembled by threading plain end pipe and screwing on long hub flanges. The connection shall then be power tightened and refaced across both face of flange and end of pipe. Provide 1/16-inch ring gaskets of red sheet rubber meeting the requirements of Grade I, Table I of ASTM Specification D1330-66, Sheet Rubber Gaskets. Connections shall be made with machine bolts and hexagonal nuts.

(4) Fittings

All fittings for PVC pressure pipe shall be ductile iron mechanical joint meeting the requirements of ANSI/AWWA C153/Z21.53-84 ductile iron compact fittings three inch through 12 inch for water and other liquids. *All fittings to be meg-a-lug.*

e. Coatings for Ductile Iron Pipe

All ductile iron pipe and fittings to be installed underground shall be coated on the interior with Protecto 401 ceramic epoxy lining and exterior with hot-dip coal-tar. The exterior of all above ground pipe shall receive a coat of rust inhibitor prime compatible with the finish paint schedule. All bolts, nuts, studs and other uncoated parts of joints for underground installation shall be coated with asphalt or coal tar prior to backfilling. In

lieu of the above coating “H2 sewer safe” as manufactured by Griffin Pipe Products Co. may be used.

f. Metallic Tracer Wire

Tracer wire shall be placed in the trench and shall be approximately 12” above the pipe to be installed. The wire shall be 12 gauge insulated THW and shall be terminated so that a locating device can be easily attached. All splices below grad shall be insulated.

7. Vacuum Sanitary Sewers

a. General Considerations

Vacuum sanitary sewer collection systems will be evaluated and approved on a case-by-case basis. All vacuum sewers will comply with Florida Department of Environmental Protection standard for such systems.

(1) Pipe

Rubber ring joint PVC class 200, SDR 21. For rubber ring joint pipe a certificate shall be provided by the manufacturer stating that the pipe has been tested with air at 24 inches of mercury vacuum with less than one percent per hour leakage, and is guaranteed for such use.

(2) Fittings

Tee fittings shall not be used for vacuum service.

(3) Testing

The complete vacuum sewer system including the vacuum collectors station shall be subjected to a vacuum of 24 inches of mercury and allowed to stabilize for 15 minutes. There shall be no loss greater than one percent per hour over a four-hour test period.