

**SECTION UC-370****CLEANING AND TESTING GRAVITY SEWERS****PART 1 - GENERAL**

## 1.01 SCOPE OF WORK

The Contractor shall furnish all material, labor and equipment necessary to clean and test gravity sewers and sanitary force mains and shall conduct all testing required, under the direction of the Engineer.

## 1.03 QUALITY ASSURANCE

Cleaning and testing shall be performed in strict accordance with these specifications.

**PART 2 - PRODUCTS**

(Not Used)

**PART 3 - EXECUTION**

## 3.01 GENERAL

- A. All drain and gravity sewer line segments or sections shall be separately and individually lamped and tested for infiltration and exfiltration, unless otherwise allowed by the Engineer. A line "segment" or "section" shall be defined as a run of pipe between a manhole and the next manhole either up or down stream of that manhole.
- B. Each section of gravity pipe sewer, upon its completion or at such other time as the Engineer may direct, is to be cleaned, tested and inspected.
- C. The allowable limits of infiltration or exfiltration or leakage for the drain or sewer lines, or any portion thereof shall not exceed the appropriate rate as specified in 3.04 "Tightness Standards", below. Duration of tests shall be a minimum of two hours.
- D. Since allowable leakage is defined in gallons per hour, testing shall be conducted in, at a minimum, two independent one-hour test periods. Testing shall continue for additional one-hour periods if during any subsequent test period leakage increases above that of any previous test period even if the leakage is within the allowable amount. Testing shall continue until the leakage stabilizes or decreases.
- E. When allowed by the Engineer in writing, longer portions of the line may be tested. However, no more than three manhole sections or 1000 feet of sewer (whichever is the lesser) shall be tested at any one time.
- F. When multiple sections of line are tested together as specified above, the leakage

shall be calculated based on the footage of the smallest segment being tested as if all of the leakage originated in the shortest segment of the group.

- G. Prior to testing for infiltration, the system shall be pumped out so that normal infiltration conditions exist at the time of testing. The amounts of infiltration or exfiltration shall be determined by pumping into or out of calibrated drums, or by other approved methods.
- H. The exfiltration test will be conducted by filling the portion of the system being tested with water to a level which will provide a minimum head of 2-feet in a lateral connected to the test portion, or, in the event there are no laterals in the test portion, a minimum difference in elevation of 5-feet between the crown of the highest portion of the drain or sewer and the test level.
- I. If the ground water level is above the crown of the highest portion of the drain or sewer, the 5-foot differential shall be measured between the ground water level and the test level. Where insufficient depth of cover is available to produce a 5-foot differential, the maximum differential producible between ground water elevation and a test elevation set to avoid flow out of low manholes or into adjacent structures connected to the test section shall be used.
- J. Where infiltration or exfiltration exceeds the allowable limits specified herein, the defective pipe, joints, or other faulty construction shall be located and repaired by the Contractor.
- K. The Contractor shall locate and repair all leaks until the leakage is reduced to the limits specified. Any observed leaks or obviously defective joints or pipes shall be repaired or replaced as directed by the Engineer, even though the total leakage is below that specified above.
- L. Lamping Test- Each section of sewer shall show, from each end, a full circle of light.

### 3.02 DEFECTS

In addition to the above requirements, the following shall also apply:

- A. All repairs shown necessary by the tests are to be made, broken, cracked or obviously defected pipe replaced, all deposits removed, the sewer left true to line and grade, as herein specified, and entirely clean, free from lumps of cement, protruding gaskets, bulkheads, etc. and ready for use.
- B. Each manhole or other appurtenance to the system shall have the specified size and form, be watertight, neatly and substantially made with the top set permanently to exact position and grade, and shall serve well and fully its intended use.
- C. Any defects found in the system shall be corrected by the Contractor in accordance with the requirements of the Specifications or the MDWASD Design and Construction Standards, as approved by the Engineer.

- D. In the event that a sewer line or structure, such as a manhole, leaks during the period that the Warranty or Contract Bond is in effect, the Contractor shall be required to return and replace it with a new section of pipe or manhole or, if approved by the Engineer, to eliminate infiltration leaks by external grouting or encasement. After the leaks have been stopped, all visible cracks shall be repaired inside the manhole.

### 3.03 ACCEPTANCE

- A. No pipe installation will be accepted if the leakage is greater than that determined by the above requirements.
- B. The Contractor shall locate and repair all leaks until the leakage is reduced to the limits specified. Any observed leaks or any obviously defective joints or pipes shall be repaired or replaced as directed by the Department, even though the total leakage is below that specified above.
- C. The tests and repairs shall be continued or repeated until the Department is assured that the leakage into or from the section of line under test is less than the amount specified.

### 3.04 TIGHTNESS STANDARDS

Effective since 1987 (Per Public Notice No. 9), the Department adopted new tightness standards for gravity sanitary sewers and sanitary force mains to be installed within the it's service area. The new standards for maximum allowable exfiltration rates are to minimize the risk of contaminating the County's groundwater supplies in the Biscayne Aquifer. These standards are issued to comply with those adopted into Chapter 24 of the County Code by Ordinance 86-42, and to have leakage requirements for clay and PVC pipe materials. The term "cone of influence" as used below refers to limits of wellfield protection areas as defined the County. Tightness standards are specified below:

#### A. GRAVITY SANITARY SEWERS

The maximum allowable exfiltration, infiltration, or leakage in gravity sanitary sewers shall be as listed below, with no allowances for manholes or laterals. The duration of all tests shall be a minimum of two (2) hours. Any observed leaks or any obviously defective joints or pipes shall be replaced even when the total leakage is below that allowed. Only the piping materials listed for each specific area will be permitted in that area, including both gravity sanitary sewers and laterals. (Where reference is made to a "10 Day Travel Time" contact the Department or DERM for further information.)

#### 1. Residential Zoned Areas

1.1a Within cone of influence and **outside** 10 Days Travel Time:

Mains: D.I.P. - 50 gpd/in. diameter/mile  
C900 PVC - 50 gpd/in. diameter/mile

Laterals: may be D.I.P., C900 PVC, or

## X.H.C.I.(Extra Heavy Cast Iron Soil Pipe)

1.1b Within cone of influence and **within** 10 Days Travel Time:

Mains and laterals shall only be D.I.P.

## 1.2 Outside of cone influence:

Mains: D.I.P. - 100 gpd/in. diameter/mile  
 C900 PVC - 100 gpd/in. diameter/mile  
 PVC - 100 gpd/in. diameter/mile  
 V.C.P. - 100 gpd/in. diameter/mile

Laterals: may be D.I.P., C900 PVC, PVC, or  
 X.H.C.I. or V.C.P.

2. Commercial Zoned Areas2.1a Within cone of influence and **outside** 10 Days Travel Time:

Mains: D.I.P. - 20 gpd/in. diameter/mile  
 C900 PVC - 20 gpd/in. diameter/mile

Laterals: may be D.I.P., C900 PVC or X.H.C.I.

2.1b Within cone of influence and **within** 10 Days Travel Time:

Mains and laterals shall only be D.I.P.

*Note: In any event and any zoned areas, the Department may require D.I.P. based on minimum cover requirements, installation in grass areas or at depths of 14 feet or greater.*

## 2.2 Outside of cone influence:

Mains: D.I.P. - 100 gpd/in. diameter/mile  
 C900 PVC - 100 gpd/in. diameter/mile  
 PVC - 100 gpd/in. diameter/mile  
 V.C.P. - 100 gpd/in. diameter/mile

Laterals: may be D.I.P., C900 PVC, PVC, or  
 X.H.C.I. or V.C.P.

3. Industrial Zoned Areas

## 3.1 Within cone of influence:

Mains: D.I.P. - 20 gpd/in. diameter/mile

Laterals: may be D.I.P. or X.H.C.I.

## 3.2 Outside of cone influence:

Mains: D.I.P. - 100 gpd/in. diameter/mile  
V.C.P. - 100 gpd/in. diameter/mile

Laterals: may be D.I.P., X.H.C.I. or V.C.P.

B. SANITARY FORCE MAINS - ALL AREAS

1. Sanitary force mains shall be constructed of either Protecto 401 lined ductile-iron pipe and fittings or prestressed concrete plastic lined (120° T.D.C. minimum) cylinder pipe and fittings meeting current Department Specifications.
2. No such ductile-iron pipe sanitary force main shall exfiltrate or leak at a rate greater than the allowable leakage rate specified in AWWA C600 (latest edition) at a test pressure of one hundred (100) psig. The duration of all test shall be a minimum of two (2) hours. Any observed leaks or any obviously defective joints or pipes shall be repaired or replaced even when the total leakage is below that allowed.
3. No such prestressed concrete cylinder pipe sanitary force main shall exfiltrate or leak at a rate greater than one-half (2) the allowable leakage rate specified for ductile iron pipe in AWWA C600 (latest edition) at a test pressure of one hundred (100) psig. The duration of all test shall be a minimum of two (2) hours. Any observed leaks or any obviously defective joints or pipes shall be repaired or replaced even when the total leakage is below that allowed.
4. See Section UC-170, "Cleaning and Testing of Main".

END OF SECTION