

SECTION 3840 - MANHOLE VACUUM TESTING

PART 1 - GENERAL

1.1 SCOPE OF WORK:

Provide all labor, materials, equipment and services required for manhole vacuum testing specified herein.

PART 2 - EXECUTION

2.1 VACUUM TESTING OF MANHOLES:

- A. This specification shall govern the vacuum testing of sanitary sewer manholes and structures and shall be used as a method of determining acceptability by the OWNER, in accepting maintenance of a sanitary sewer manhole or structure on behalf of the public. Vacuum testing shall be according to ASTM C1244, except as specified otherwise herein. Other forms of testing of some manholes may be required, as deemed necessary by the OWNER.

At least twenty-five percent (25%) of the total sanitary sewer manholes and other structures on each project shall be vacuum tested as specified herein. Manholes to be tested shall be selected by the ENGINEER at the time of testing. No advance notice will be provided to the CONTRACTOR as to which manholes will be tested. If more than ten percent (10%) of the manholes tested fail the initial test, an additional twenty-five percent (25%) of the total manholes shall be tested. This process shall continue until a series of manhole (25% of the total) successfully tests with no more than 10% initial failure or until all manholes have been tested.

The plans may require vacuum testing for specific manholes in areas especially susceptible to infiltration. The manholes selected for testing by the ENGINEER shall be in addition to the manholes indicated on the plans (i.e. the manholes indicated on the plans will not count toward the required 25%).

- B. Manholes shall be tested after installation with all connections in place.
1. Lift holes, if any, shall be plugged with an approved, non-shrinkable grout prior to testing.
 2. Drop connections shall be installed prior to testing.
 3. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone, slab or grade rings.
 4. Manhole vacuum testing shall be performed after all adjacent underground utilities have been installed and all manholes have been backfilled and finished to final grade. Upon request of the CONTRACTOR, manhole vacuum testing may be performed prior to installation of adjacent utilities, after all manholes have been backfilled and finished to final grade and after the sewer leakage testing has been completed, with the following special condition: All manholes found to have been damaged or disturbed prior to the final (one-year) inspection shall be corrected and vacuum tested at that time, regardless of whether or not they were originally vacuum tested.
 5. If a coating or lining is to be applied to the interior of the manhole the vacuum test must not be performed until the coating or lining has been cured according to the manufacturer's recommendations.
 6. If existing manholes are to be vacuum tested (e.g. in the case of a sewer rehabilitation project), the ENGINEER and CONTRACTOR must deem the manhole structurally sound prior to vacuum testing.
- C. Procedure for testing shall be as follows:
1. Temporarily plug all pipes entering the manhole. Each plug must be installed at a location

beyond the manhole/pipe gasket (i.e. outside the manhole wall), and shall be braced to prevent the plug or pipe from being drawn into the manhole.

2. The test head shall be placed inside the rim of the cast iron frame at the top of the manhole and inflated, in accordance with the manufacturer's recommendations.
3. A vacuum of at least ten inches of mercury (10" Hg) shall be drawn on the manhole. Shut the valve on the vacuum line to the manhole and shut off the pump or disconnect the vacuum line from the pump.
4. The pressure gauge shall be liquid filled, having a 3.5-inch diameter face with a reading from zero to thirty inches of mercury.
5. The manhole shall be considered to pass the vacuum test if the vacuum reading does not drop more than 1" Hg (i.e. from 10" Hg to 9" Hg) during the following minimum test times.

Minimum Test Times for Various Manhole Diameters			
MH Depth (feet)	4' Diameter MH	5' Diameter MH	6' Diameter MH
15 Feet or less	50 sec.	1 min. 5 sec.	1 min. 20 sec.
15.01 to 30 Feet	1 min. 20 sec.	1 min. 45 sec.	2 min. 10 sec.

6. If a manhole fails the vacuum test, the manhole shall be repaired with a non-shrinkable grout or other material or method approved by the ENGINEER. The manhole surfaces shall be properly prepared prior to any repairs. Once the repair material has cured according to the manufacturer's recommendations the vacuum test shall be repeated. This process shall continue until a satisfactory test is obtained.
7. All temporary plugs and braces shall be removed after each test.

PART 3 - BASIS OF PAYMENT

Vacuum testing of manholes is not a pay item. Payment will be included under the manhole bid item(s).

END OF SECTION