**Manhole Vacuum Testing Defined:** Using vacuum pressure (negative air pressure) to test the integrity of a manhole structure. Basically air is evacuated out of the manhole and monitored to check if the air leaks back in.

**ASTM:** C 1244 – 05a: Standard test method for concrete sewer manholes by the negative air pressure (vacuum) test prior to backfill.

**Why:** If a manhole is not installed properly it can leak untreated effluent into the surrounding environment "referred to as Exfiltration". Untreated sewage pollutes rivers, lakes, streams and drinking water.

Leaking manholes can also allow rain water (storm sewer) to enter the sanitary sewer system "referred to as infiltration" causing the city to treat many gallons of rain water that could have safely filtered into the environment through the storm sewer system. Treating storm water is very costly to local governments. Infiltrating rain water can also cause a sanitary sewage treatment facility to be inundated with effluent beyond its capacity. Excess effluent can cause the treatment facility to release untreated sewage into the environment rather than allow the effluent to back up into homes and business.

**Who:** Typically underground contractors perform vacuum tests on manholes that they have installed. The city or county may have an inspector on the job to witness the manhole vacuum test to make sure the manhole meets all the requirements. .

**What Equipment:** Below is a list of equipment that your contractor will need to perform a manhole vacuum test. The contractor will also need to provide an air compressor with a minimum of 80 cfm. Additional equipment may be needed depending on the number and size of inlet lines. Our example will include all the equipment needed for vacuum testing a manhole with no more than two inlets that are as no smaller than 8" and no larger than 12". Also, larger head assemblies are available for openings larger than the ones listed below.

| | | **Plate Style Equipment List** |
|---|---|---|
| Qty | Part # | Description |
| 1 | 550-38 | 38" Flat-Max Manhole Vacuum Plate Style Assembly |
| 1 | 550-99 | Max-Vac Venturi Pump |
| 2 | 200-812 | 8"-12" FatBoy Plugster (Blocking Only) |
| 2 | 430-30 | 30' Fill Kit with Gauge |
| | | **Donut Style Equipment List** |
| Qty | Part # | Description |
| 1 | 550-2127 | 21"-27" Bladder Max Manhole Vacuum Donut Style Assembly |
| 1 | 550-99 | Max-Vac Venturi Pump |
| 2 | 200-812 | 8"-12" FatBoy Plugster (Blocking Only) |
| 2 | 430-30 | 30' Fill Kit with Gauge |

## Flat-Max (Plate Style) or Bladder-Max (Donut Style) Difference:

**Below are some of the differences between a plate style and a donut style manhole vacuum head assembly.**

**Flat-Max (Plate Style)**

- Seals on top of the frame or on top of the manhole cone.
- Tests the entire manhole including the grade rings, ring and cover.
- Normally cannot be used if the pavement or concrete has been installed.
- Closed cell foam provides the seal.

**Bladder-Max (Donut Style)**

- Allows the manhole to be tested (sealed) below the grade rings, frame and cover.
- Used when the pavement has been installed prior to testing the manhole.
- Rubber bladder is used to seal the top of the manhole.

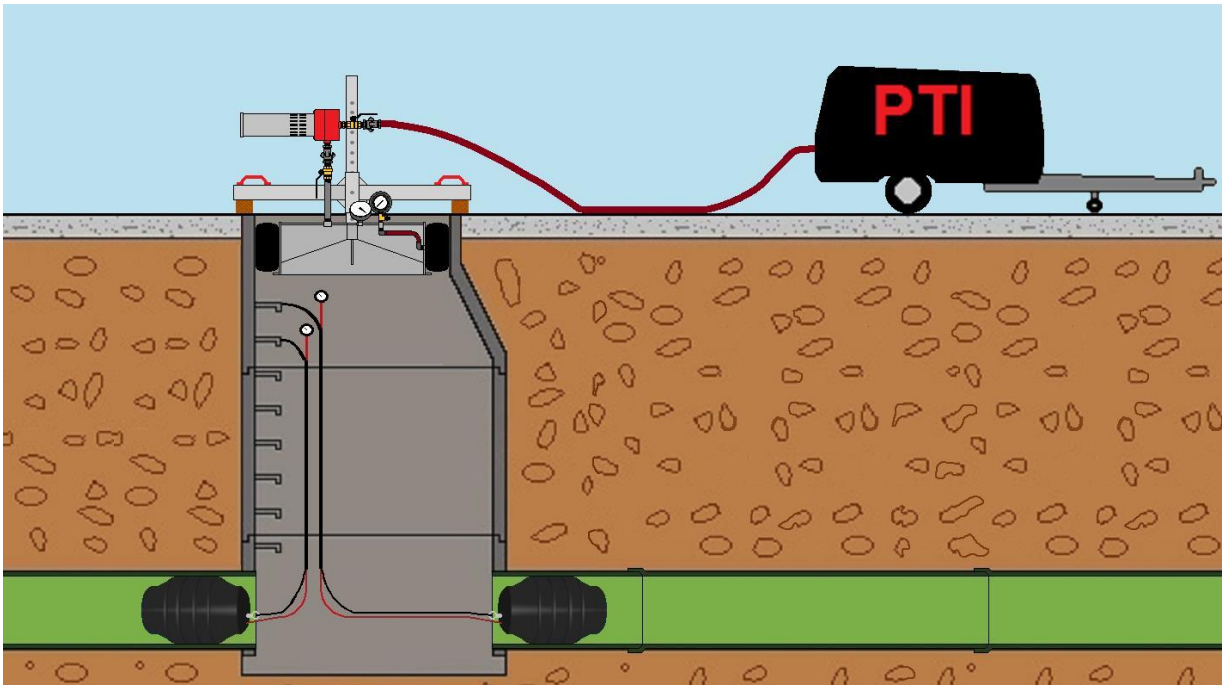


Illustration 1: Bladder-Max Manhole Vacuum Test Assembly

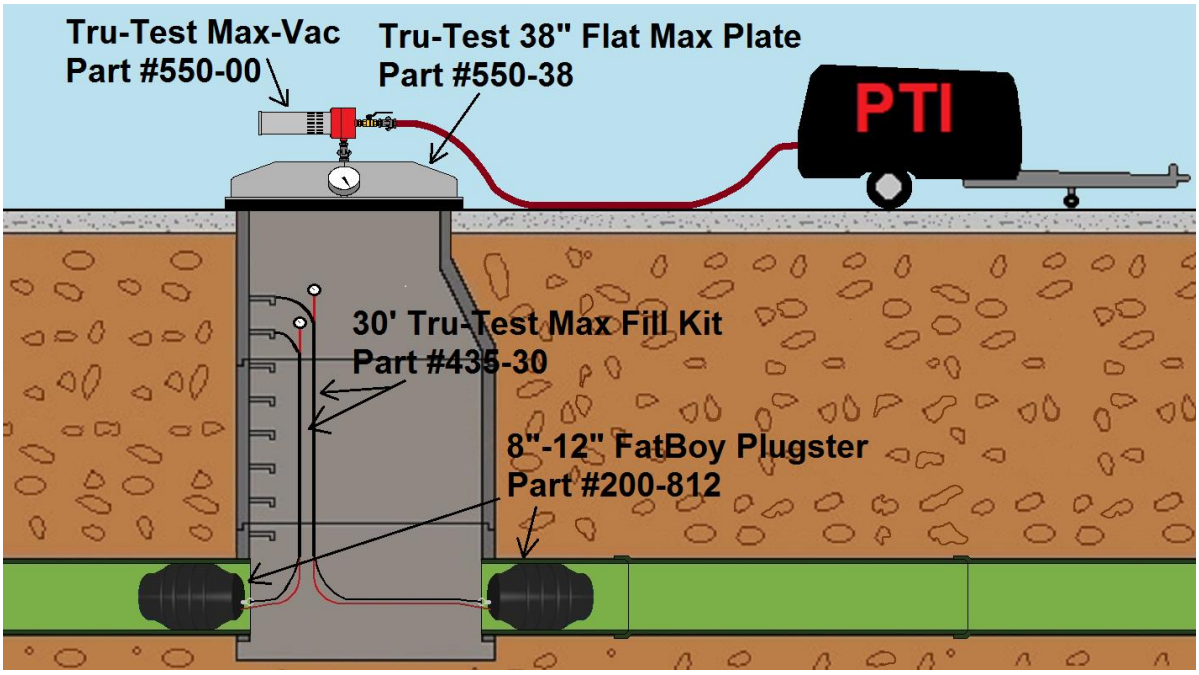


Illustration 2: Flat-Max Manhole Vacuum Test Assembly

## Plug Technologies, Inc. Vacuum Test Equipment Features:

- ✓ Easy slide design makes adjusting the height of the Bladder-Max bladder quick and easy.
- ✓ 11 different pin placements allow the user maximum height adjustment flexibility.
- ✓ Bladder inflation assembly allows easier and quicker inflation and deflation of the bladder. No need to force air in and out of a tire valve.
- ✓ 4" Grade "A" liquid filled gauge that is angled to allow easy reading of the gauge from a safe distance.

**Max-Vac Venturi Pump:** The venturi pump is installed on the Flat-Max or the Bladder-Max manhole vacuum and is used in conjunction with and air compressor (80 cfm or larger) to generate the 10 HG (inches of mercury) that is required for most manhole vacuum tests.

**Soapy Bubble Test:** This test will allow you to identify the leaks in a manhole that is being tested. Wet down the inside of the manhole with a soapy water solution and draw a vacuum (1 inch of mercury). Turn off the vacuum test and let the pressure equalize in the manhole. Remove the vacuum head assembly and use a flashlight to look for the soapy bubbles. Everyplace that you can see soapy

bubbles means that air was being sucked into the manhole and those are the areas the contractor should concentrate on sealing before the manhole is retested.

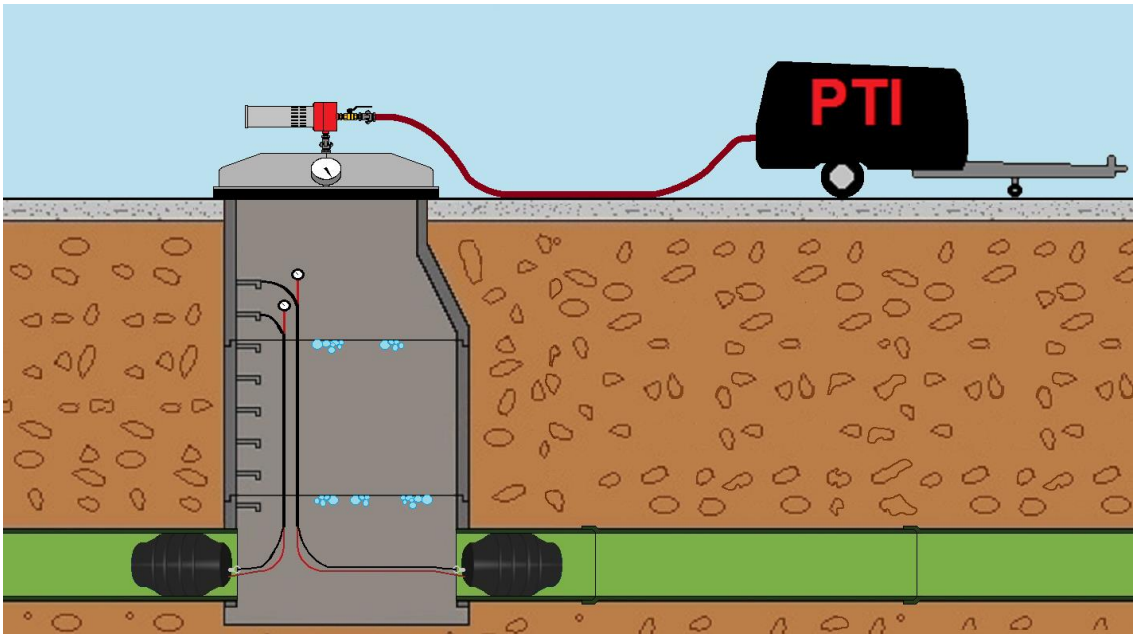


Illustration 3:  Flat-Max Performing a Soapy Bubble Test.