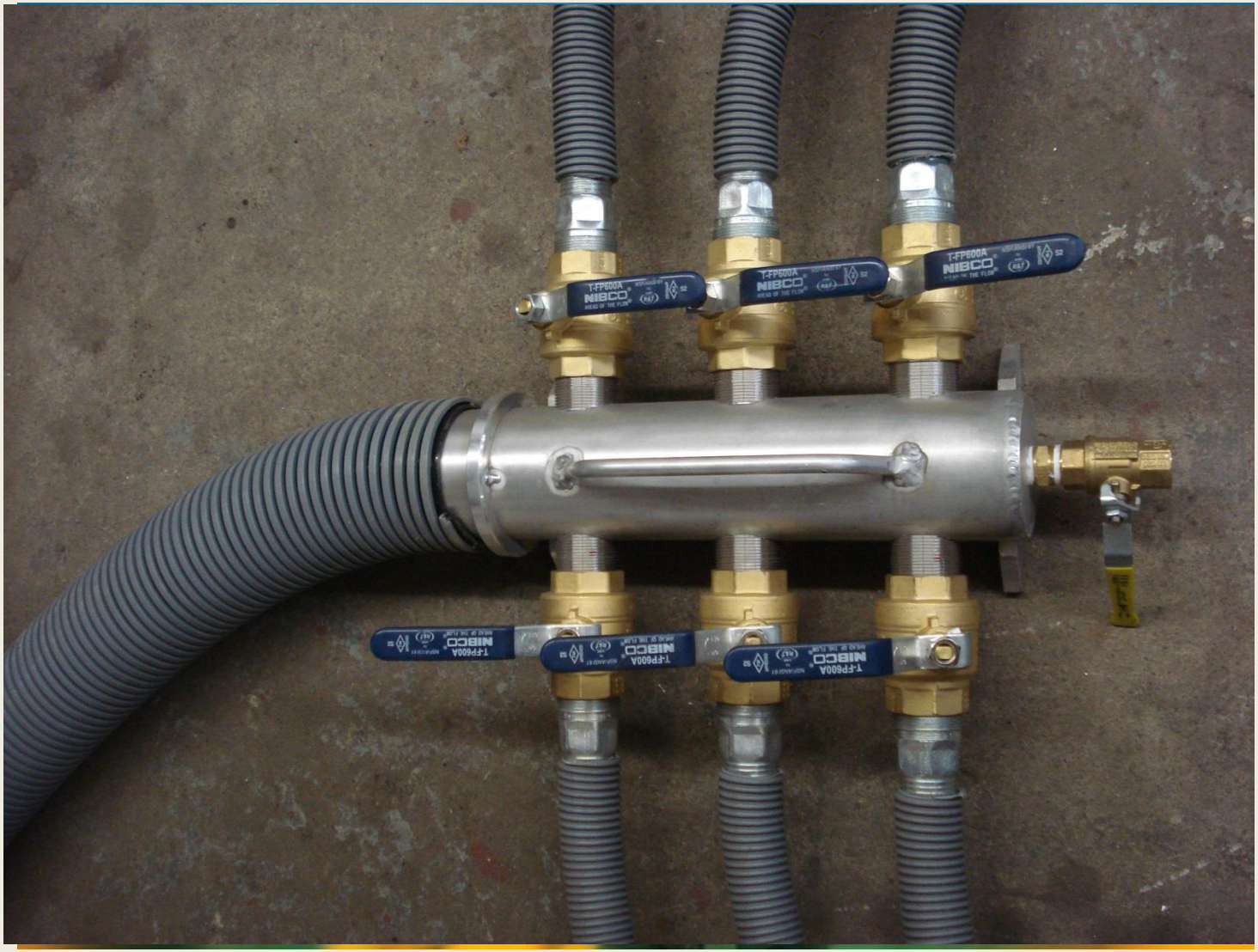

Gas Evacuator

TELLUS
UNDERGROUND TECHNOLOGY, INC.

The Tellus gas evacuator system uses a diesel driven positive displacement vacuum blower to remove uncontrolled gas from areas under pavement such as streets and sidewalks.

The truck shown above is equipped with a Tellus “zero maintenance” filtration system to protect the vacuum producer from dirt or water damage. The system is also equipped with 95 gallon fuel tank to allow the truck to remain “on- station” for a minimum of 30 hours without interruption or refueling.

Gas evacuator systems can be used with any vacuum excavation that is equipped with a 4” diameter vacuum digging hose and has the ability to produce a flow rate from 780 to 1,100 SCFM.

Tellus Operating Guidelines

TELLUS
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Operating Guidelines

Gas Evacuator Manifold

Introduction:

The Tellus Underground Technology "Gas Evacuator Manifold" is a device that is designed to remove underground gas that has become entrapped under developed areas such as streets and sidewalks as a result of a leaking gas supply line. The manifold consists of a number of vacuum headers that are designed to be positioned over drilled holes in the pavement (bar holes) and connected to a vacuum source that has the ability to draw the gas from the ground and vent it safely into the atmosphere.

The "Gas Evacuator Manifold" is fitted with controls that allow the operator the ability to control (1) the vacuum level at each of the drilled holes in the pavement (2) mass flow of the gas/air mixture flowing through the manifold and (3) gas/air ratio flowing through the manifold and vacuum system. A complete understanding of all of the above factors and the ways in which they interact will result in efficient and safe operation of the manifold.

Sensing Vacuum Levels:

The "Gas Evacuator Manifold" is designed to be used in conjunction with rotary lobe vacuum blowers that have the ability to displace a minimum of 780 SCFM. To achieve safe and controlled operation of the vacuum system during a gas venting procedure the operator must determine if the system contains a vacuum relief valve and if so at what vacuum level the relief valve will begin to open. After making a determination of the minimum opening pressure for the vacuum relief valve the operator should be sure that the system is always operated at vacuum levels that are no greater than 1 inch of mercury below the minimum opening vacuum level for the vacuum system relief valve.
The valve manifold is equipped with seven valves and a main vacuum connection. The six 1-½" valves are used to determine the flow rate at each of the six vacuum headers while the seventh valve is used to dilute gas level downstream of the Gas Evacuator. The

¾" gas dilution valve should be connected to a compressed air source so that gas free air can be added as required.

Sensing Gas Mixture Ratio:

The "Gas Evacuator Manifold" can be used in conjunction with an exhaust gas sampling device that is designed to be attached to the exhaust stack of the vacuum system replacing the 4 inch rain cap that is supplied with many of the vacuum excavation systems on the market. This device is designed to be used in conjunction with a calibrated Heath "Gasurveyor" 500 series gas detector (or equivalent). Accurate gas/air ratio can be determined by first opening the vent valve for 15 seconds immediately before taking a reading, then closing the vent valve and starting the gas detectors sampling cycle. If the gas detector registers dangerous gas/air ratios the operator should dilute the mixture by adding compressed air using the dilution valve that is attached to the main manifold. If a situation arises in which the gas/air ratio still exceeds safe operation levels the operator should consider shutting off one or more of the valves that are attached to the vacuum headers to reduce the flow of gas into the manifold.

Sensing Mass Flow Rate:

The "Gas Evacuator Manifold" can be used in conjunction with a venturi or pitot tube that is designed to give the operator the ability to determine mass flow rate of the gas/air mixture through the manifold. Since all vacuum excavation systems do not have the same flow and vacuum capabilities it will be helpful to determine the performance level of the vacuum producer before a valid operating procedure can be established. With the ability to measure the quantity if gas and air moving through the manifold the operator can (1) determine the quantity of compressed air that will be necessary to dilute the air/gas mixture to a safe level (2) establish a timeframe for purging an area to an acceptable gas level and (3) determine the number of bar holes that can be evacuated simultaneously.

Mass flow rate can be determined by simultaneously reading the differential pressure across the venturi and the absolute pressure downstream of the venturi. Figure 2 contains graphs that can be used to establish flow rate.

Using the "Gas Evacuator Manifold":

The "Gas Evacuator Manifold" will produce the most effective and efficient performance when it is operated at the highest possible vacuum level. Since operating conditions will result in numerous variables in vacuum level, flow rate, gas/air ratio, it may be difficult to achieve maximum effectiveness in all situations. In the case of a very large gas leak the operator may find that he cannot provide enough compressed air to dilute the gas/air ratio to a safe level. Performance may also be compromised in situations where highly porous soils result in a condition in which the vacuum producer cannot produce sufficient flow to hold a high vacuum level.