

## **Jacob's 430 Tracer Gas Sniffer**

### **Safe Work Procedure**

**2023**

#### **1. Safety First**

Safety is a top priority. Personal Protective Equipment (PPE) recommended for the job includes:

- ✓ Hard hat
- ✓ Eye protection
- ✓ Work shoes
- ✓ Work gloves
- ✓ Long pants and sleeves
- ✓ High Visibility Clothing (when working by roadways)

#### **2. Applicable Systems**

For inspection, applicable systems are water, gas, and fuels. The systems must be closed and isolated to build low gas pressure.

#### **3. Tracer Gas Cylinder and Regulator**

Tracer gas is a mixture of 95% nitrogen and 5% hydrogen, which can be purchased separately from welding supply stores like Praxair and Airgas. To maintain productivity with suppliers, pre-order and set up recurring deliveries.

The tracer gas is non-toxic, non-flammable, non-explosive, and environmentally friendly. To pressurize a system with a given volume to 30 psi, add a volume of gas equal to the system's volume. One scf (7.5 gal) of tracer gas weighs 0.07245 lbs.

For instance, if the system's volume is 100 scf, you will need to add 100 scf of tracer gas, which is 750 gal of gas and weighs 7.245 lbs.

The gas regulator should be classified for hydrogen and show two values: gas pressure inside the bottle and gas pressure in the system.

It is recommended to use quick connects for the gas pressure to the system and the feed port of the regulator so that you can switch hoses or gauges as needed depending on the system you are working with.

#### **4. General work procedure for a typical water system**

- 4.1 Safety should always be a top priority, and PPE (Personal Protective Equipment) must be worn at all times.
- 4.2 Shut down the water supply to the system to prevent any water flow that may interfere with the gas tracer.
- 4.3 Drain the water from the system and release pressure from it. You can set up the tank before shutting off the water supply to document water pressure using the regulator's gauge.
- 4.4 After releasing pressure, close the system and ensure that it is isolated.
- 4.5 Connect the tracer gas bottle and open it to introduce tracer gas to the system through a hose bib, angle stop, backflow petcock, or quick coupler.
- 4.6 Allow the gas to flow into the system to build pressure of 30-50 psi. It is a good idea to feed the gas into the line at the same pressure the water was documented at.
- 4.7 Maintain gas pressure. However, if you notice a significant leak and see a reduction in pressure, add more gas to keep the pressure at 30-50 psi. The amount of time it takes for the gas to reach the leak will depend on the length of the line, size of the line, and size of the leak. You can stand by the tank until you hear a surge, which means the gas has reached the leak. At this point, you can reduce the gas feed to around 10-20 psi to conserve gas and avoid using a full bottle for one job. For longer lines, it also helps to purge the water at the last outlet of the line while applying pressure with gas.
- 4.8 Start the Jacobs 430 sniffer system and follow the User Manual instructions. Wait for two minutes until the system finishes the "preparing" mode and the ppm (parts per million) is down to zero. The system is now ready for work.
- 4.9 Follow the path of piping until you detect the gas and the concentration of gas (in terms of ppm) increases. The leak is located where the ppm of detected tracer gas is at its maximum. In some scenarios, the tracer gas may give a wide radius, and if this is the case, reduce the pressure to 5 psi to pinpoint the location better.
- 4.10 After finding the leak, turn off and disconnect the tracer gas bottle. The remaining tracer gas in the system can be released into the atmosphere, and the equipment can be wrapped up.