

Effects of High Air Pipe Flow Rates on Delivery Pressure

With the almost yearly reduction of labor hours dedicated to cable pressure maintenance, an expected increase in cable leaks has occurred. One of the most obvious results of these leaks is the high air flow rates seen on pipe routes.

What exactly do the high flow rates do to cable pressures?

A quick check of cable pressures on an air pipe route that is flowing 80 Standard Cubic Feet per Hour (SCFH) for example, will show that the majority of readings are below the minimum underground cable pressure standard of 5 psi.

Do all of these cables have leaks, or is something else going on?

It is possible that many of the cables have leaks, but the bigger problem is low air pipe delivery pressure.

A test was conducted here at System Studies on two different CA 3131 air pipes to determine the impact that flow rates have on pressure drop within the pipe. The results are shown in the graph below. The graph indicates what the expected delivery pressure would be for the FIRST manifold on the route for each of the given air flow rates (SCFH). The results are based on the assumption that the pipe alarm panel in the office is

regulated to 10 psi delivery pressure and the manifold is located at 6,000' from the office.

Two significant findings resulted from this experiment:

1. There was a big difference in the amount of pressure drop in two seemingly identical pipes. Both of them are standard 1/2" CA 3131 air pipes. In actual field use similar pressure drops can be expected for pipe flow rates of 80 SCFH or higher, while it is possible that they could actually fall somewhere outside the shaded area shown on the graph.
2. More importantly, we observed that when the air flow rate of a pipe exceeds 80 SCFH, there is a huge drop in delivery pressure at the first manifold. Even cables with no leaks will have inadequate cable protection.

What does this mean for the limited hours used for cable maintenance?

It means that leak locating efforts should be directed toward finding and fixing the big leaks, those using the most air. These are the ones close to air sources that can be identified by using air flow leak locating techniques. Reducing air consumption (SCFH) in the air pipe increases delivery pressure and improves overall cable pressure protection.

Pressure Drop on 1/2 Inch Air Pipe at First Manifold Location

Example: For a flow rate of 80 SCFH, the delivery pressure at the 1st manifold would be between 7 and 5.5 psi. Keep in mind that the end pipe delivery pressure standard is 7.5 psi.

