

# How the System Quality Index (SQI) Works

The System Quality Index (SQI) is a quality rating system for air pressure routes and wire centers. The range of the SQI is from zero (bad) to 100 (excellent). Typically, a score of 80 is considered optimum. Pressure-MAP calculates the index once a day using its 5:00 a.m. readings. The SQI is based on both pressure readings (50 percent) and air flow per sheath mile of cable being fed (50 percent). Because it factors in sheath mileage, it is a true weighted index—for example, a route with 10 sheath miles of cable will have 10 times more impact on the office SQI than a route with 1 sheath mile.

## Purpose of the SQI

There are two primary functions of the SQI:

1. To help identify where to work (what offices and/or routes) and where not to work.
2. To monitor improvements on a route as it is worked on.

## Pressure Calculations

PressureMAP looks at all pressure readings on a route or wire center and compares them to the “standard.” For example, the reading for an underground transducer (Device Type UP) is rated against 5.0 psi, the standard. The following are some of the ways that pressure readings influence the index:

- If a UP transducer reading is 5.5 psi, a "half pound" credit is given. A “half pound” reduction in the index would occur for a 4.5 psi UP device reading. However, if these readings occurred at two transducer locations on the same route, they would essentially off set each other (equal 5.0 psi) and the route would be standard.
- The air pressure standard for a endpoint pressure transducer (PressureMAP Device Type EP) is 7.5 psi. Consequently, a 5.0 psi reading for a EP pressure transducer would result in a 2.5 psi reduction in the index.
- Pressure transducers that read "open" or "short" are counted as a 0.0 psi reading.

All the pressure transducer readings on a route are averaged together. What this means is that one relatively low-reading transducer on a route that has 15 pressure transducers will typically not have much impact on the index. However, if there is only one transducer on the route and it reads “open,” it will have a HUGE negative impact on the index.

## Flow Calculations

The flow side of the SQI equation is based on the air flow (SCFH) per sheath mile of cable being fed. This standard is typically between 1.25 SCFH and 2.0 SCFH per sheath mile, depending upon local standards.

The SQI flow calculation for a route is calculated two ways:

1. In most situations the calculation is taken from the measured air flow at the pipe alarm panel (Device Type SF) and the Optimum Air Usage (OAU) for that device.
2. If there is no pipe panel, the sum of the flow rates at the manifolds (Device Types MF) and the sum of the OAUs for these manifold flow transducers are used.

There are other factors that affect the flow component of the SQI index:

- A "pegged" (over range) flow transducer is actually calculated using 1.5 times the flow reading. For example, if an SF flow transducer is pegged at 100 SCFH, a flow of 150 SCFH is used in the SQI calculation.

- An “open” or non-reading transducer will have a flow rate of 5 times the OAU calculation used.

## Frequently Asked Questions

*What’s the quickest way to improve an office index?*

Work on routes that have the lowest SQI, especially routes that are relatively large (for example, a route consisting of 15 sheath miles of cable in an office that has a total of 40 sheath miles of cable.) Building the SQI on a route with only 2 sheath miles will have almost no impact on an office SQI.

*How do I build the SQI on a route?*

First, look at “open” or “short” readings on pressure transducers, especially EP and UP devices. Remember, a non-reading pressure transducer is counted as 0.0 psi. Work on pressure transducers that have 0.0 or 0.5 psi readings. When it comes to flow transducers, fix both the non-reading devices and the ones that are pegged.

*What if a route has no reading (blank)*

This means that there is either no pressure or no flow transducer on the route. There must be at least one flow transducer and one pressure transducer on the route in order to calculate an SQI index. Also, the flow transducer (SF or MF Device Type) must have an OAU designation.

*What does a zero (0) SQI mean?*

It means that the route is in really really bad shape.

## Things to Remember

- Typically, an SQI below 50 is a result of bad PressureMAP data. Check the sheath mileage associated with the route. It might be too low.
- Once again, open circuits will absolutely kill an SQI.
- Building the delivery pressure of the air pipe (endpipe EP device) will usually generate the biggest bang for the buck.
- Chase the flow! Highest flowing leaks are generally the easiest ones to find, and fixing them can have a major positive impact on the index.
- A flow rate of twice the OAU or less is considered acceptable.
- Accurate data provides meaningful insight into the health of the system.
- Each air pipe should be designed not to exceed 20 sheath miles of cable.

## Summary

The System Quality Index is an important tool for both air pressure technicians and managers. It identifies routes and offices that need work and those that do not. The index drives you to correct devices that are not providing readings and to fix leaks that are most damaging to the system. With an understanding of how the SQI works, it is possible to work more efficiently and make major strides in improving overall cable pressure protection.

Please call System Studies if you have any questions about how the SQI works or how you can make it work for you.

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