

TECHNICAL BRIEF

Technical Brief on Pressure Drop

All compressed air systems exhibit pressure drop between the compressor discharge and points of use. Pressure drop occurs because of friction and resistance in piping, fittings, filters, dryers, and other components. Most well-designed air systems have no more than 10% pressure drop between the compressor and any point of use.

When facing insufficient pressure at a point of use, air system operators commonly increase the discharge pressure of the compressor or increase the settings of point-of-use pressure regulators or install an additional compressor. These are costly strategies and should not be the first steps one takes to overcome excessive pressure drop.

Below are common methods for reducing pressure drop that do not increase air compressor power consumption.

- Increase the size of tubing and hoses that supply equipment and processes, using the minimum necessary length.
- Replace tubing and hoses with smooth bore hard pipes of sufficient diameter, using the minimal length necessary.
- Check supply pipes for sufficient diameter. Increase the diameter of piping as necessary. CAGI recommends that air velocity through piping be 20 feet per second or lower to minimize turbulence and pressure drop. See the "Loss of Air Pressure Due to Friction" tables in the *CAGI Compressed Air & Gas Handbook* for piping pressure loss data.
- Pipes with internal corrosion cause elevated pressure drop. Replace aging pipes with smooth bore pipe.
- Verify that the diameter of new pipes is sufficient. Minimize the length of pipe runs where possible.
- Fix air leaks.
- Evaluate the suitability of a receiver tank at high demand, intermittent flow points of use. See the paragraph on "Intermittent Demand in a Compressed Air System" in the *CAGI Compressed Air & Gas Handbook*.
- Ensure that wet receiver tanks are drained regularly. Accumulated water reduces storage volume.
- Change filter elements when differential pressure exceeds 5-7 psig or at least every six months.
- Consider installing a pressure-flow control device at the outlet of the dry air receiver tank.
- Flush coolers and heat exchangers with appropriate cleaning solvents to reduce plugging from lubricants.
- Add taps to distribution piping to allow for pressure monitoring.
- Know the recommended operating pressure for each piece of pneumatic equipment. Use pressure regulators to avoid supplying more pressure than required.

Pressure drop is a reality in all compressed air systems. Manage the problem by understanding the root causes and taking action to mitigate pressure drop.