

CASE STUDY

Pressure Drop Case Study

Properly designed and maintained compressed air systems can result in major energy savings that translate into significant dollar savings. An independent, compressed air system auditor provided the following example of a case in which a manufacturer obtained substantial savings by addressing the improper sizing of their piping system.

SITUATION: A manufacturer of commercial and residential HVAC equipment with a production facility in the southern United States needed to reduce its electricity consumption to both lower operating expenses and to take advantage of a utility rebate incentive. In cooperation with its electricity provider, the manufacturer retained the services of compressed air system energy auditor.

SOLUTION: The auditor conducted a compressed air system assessment and found peak air consumption of 2,909 scfm with an average operating pressure of 115 psig. The system consisted of several compressors feeding a wet receiver that fed a refrigerated dryer with pre-and -post filtration that connected to the main distribution piping header. The assessment revealed that the 4" piping between the wet receiver and the distribution header was undersized for the 2,909 scfm flow and created an excessive 10 psig pressure drop within this short length of piping. The recommendation was that the manufacturer replace the undersized piping with 6" pipe.

The system assessment also revealed that a single pneumatic shear required that the entire system be operated at a pressure that was approximately 15 psig higher than was required for all other operations in the facility. The auditor recommended that the pneumatic cylinders operating the shear be replaced with hydraulic cylinders. Additionally, the auditor recommended minor upgrades to the compressor controllers to allow for more precise pressure adjustment.

OUTCOME: The manufacturer replaced the 4" piping during a weekend shutdown, upgraded compressor controls, and converted the pneumatically controlled shear to hydraulics. These three system improvements resulted in the shutting down of one compressor. The modifications also allowed the compressed air system to operate with a lower average discharge pressure of 96 psig. One year after the air system upgrades the manufacturer reported eliminating 1,380,000 Kwh of electricity use, which yielded \$216,000 of savings, including utility rebates.