GREEN TIER

CASE STUDIES

August 2011

Cardinal Insulating Glass – Compressed Air

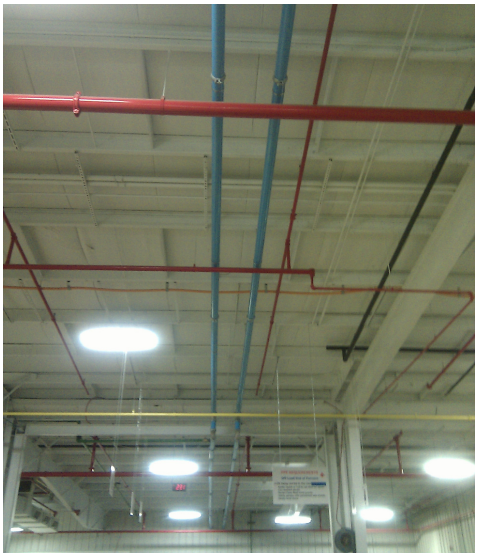
The Cardinal Insulating Glass facility in Spring Green, Wis., produces highly efficient insulating glass windows and doors. The 430,000-square-foot facility can produce 28,000 insulating glass units per day and employs 500 people. Cardinal IG is a subsidiary of Cardinal Glass Industries, a vertically integrated company whose vision is to design and fabricate the most advanced residential glass products in the industry.

Challenge

Cardinal IG uses compressed air in most operations throughout their plant, from cutting and tempering glass to almost every process on the insulating glass unit production line. The compressed air is provided by compressors spaced throughout the plant. However, Cardinal lacked an overall compressed air management strategy. As the plant grew and added new processes and production capabilities, compressors had been added as well. In 2009, Cardinal had three 150-horsepower (HP) compressors, two 40-HP compressors, and eight 30-HP compressors. Of the 770 HP available for producing compressed air, about 360–510 HP was used at any given time. Cardinal spent about $192,000 a year to produce compressed air and $5000 a year to maintain their compressed air system.

Strategy

In 2010, compressor distributor Brabazon conducted a leak study and an engineering study on Cardinal's compressed air system. The leak study identified 180 leaks, which together were wasting about $74,000 per year. The engineering study showed that the pieced-together compressed air system wasn't designed efficiently for Cardinal's needs. To optimize the system, Brabazon recommended reducing the number of compressors, running a compressed air "backbone" of 4" pipe throughout the plant, and adding expansion tanks to account for surges in compressed air requirements.



Ceiling of Cardinal IG plant with compressed air "backbone" (blue pipe)

Results

Cardinal redesigned their compressed air system based on the results of the two studies, and they now have consistent air pressure at a greatly reduced cost.

By regulating their overall system pressure, Cardinal was able to reduce it to 100 psi. They removed six 30-HP compressors, and the overall system now requires only 150–300 HP at any given time. The annual compressed air maintenance budget was halved, to about $2,500/year.

The Brabazon leak study cost about $4,000; fixing the identified leaks saves about $74,000 per year. The

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engineering study cost about $12,500. The infrastructure changes it recommended for an optimized compressed air system cost $110,000 and resulted in $29,000 in annual savings. Together, the projects had a simple payback time of 1.3 years.

Since they completed their compressed air upgrades, Cardinal has purchased equipment to conduct their own leak surveys so they can maintain their new system at peak efficiency. Additionally, when their three 150-HP compressors reach the end of their working lives, they plan to replace them with two 300-HP variable speed compressors to further improve the system's efficiency.

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