

With more than 60 years of experience in compressor technology and highly committed employees, our focus is to develop and apply the advanced

compressor technologies to achieve standard setting performance for leading products and businesses around the world.

CASE STORY

AHT COOLING SYSTEMS



ENERGY EFFICIENT PROPANE PLUG-IN CABINETS IN DISCOUNT RETAIL STORES DRIVEN BY SLV COMPRESSORS



Energy costs are high in most European countries, especially in Germany, whereas sales margins in food retailing are low. To reduce the operating cost, AHT Cooling Systems (AHT) from Austria was approached by market-leading grocery chains to supply a self-contained display cabinet which has a much higher level of efficiency than the existing cabinets. According to studies, refrigeration in standard grocery stores contribute to 55% to the use of primary energy.

AHT teamed up with Secop (Danfoss Compressors at that time) as one of their main compressor suppliers to work on a cabinet according to the specifications from the commercial end-users.

ABOUT THE SYSTEM

Self-contained display cabinets are very common among the food-retail discounters in Europe as the small floor spaces do not favor large centralized installations. The single plug-in cabinets can be quickly rearranged if standing alone or installed in an island set-up to be accessed by the customers from both sides. They usually contain frozen and low temp chilled food, rather than dairy products. The SLV-driven system has even more functionalities included for the daily operation:

- HACCP control
- Alarm to signal failures which affecting set temperatures
- Remote monitoring of temperatures and consumption
- Automatic defrost, as accumulated ice at the cabinet inboard walls is increasing energy consumption due to insulation effects.
- Control of illumination

To reduce energy consumption of the refrigeration cycle, Secop proposed to use an electronically

controlled SLV compressor which is able to adjust its rotating speed and therefore the cooling capacity delivered. Secop's experiences with variable speed compressors have shown potentials to reduce the energy consumption by up to 40% compared to a conventional compressor with a synchronous motor and fixed speed/cooling capacity running on/off.

RESULTS

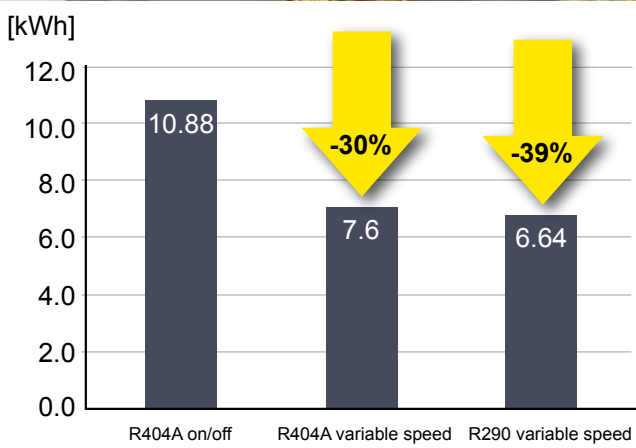
Intensive tests in labs and in the field have shown solid savings on energy consumptions. The graphic on the right shows the effect on cabinet efficiency using a variable speed compressor but same refrigerant, which was observed to be 30% less consumption compared to the identical system with a fixed speed (on/off) compressor. The change towards R290 (propane) improved the efficiency by additional 9%.

Additional savings come from secondary effects which include the scheduled (hot gas) de-frosting of the cabinet and the full integration of application functions into one controller e.g. fan and illumination control.

By adopting new compressor technologies to a conventional application and tailor a solution for plug-in cabinets in discount retail stores immense savings on total cost of ownership has been made possible and become a major success for AHT with approximately 600,000 pcs in the market today.

SUMMARY

Meanwhile, Secop has adapted the controls for SLV variable speed compressors for the North American market i.e. for 115 Volt 50/60 Hz. The demand will mainly come due to compliance with more strict energy regulations in the near future. The controller can be modified to suit into all other cabinet types as well where energy efficiency is a major buying criterion.



R404A on/off

R404A variable speed

R290 variable speed

