



Camoplast is an 80,000-square foot automotive component injection molding facility in Richmond, Québec.

CASE STUDY

Manufacturing Facility

Facility at a glance

Name

Camoplast Inc.

Location

Richmond, Quebec CA

Facility size

80,000 ft² automotive component injection molding facility

Issue

Provide innovative solutions with non-conventional uses of conventional technology

Solution

160-ton Daikin WGS water-cooled screw compressor

Daikin WGS chiller reduces annual electricity use by 30% at Camoplast manufacturing facility

At a recent ceremony recognizing excellence in electrical energy savings, the Montreal-based Hydro-Québec Utility Company awarded three citations of excellence to the system designer who used Daikin water cooled screw compressor chillers in industrial applications.

As impressive as the awards was the 30% annual energy cost savings achieved by one of those systems – the installation at Camoplast, an 80,000-square foot automotive component injection molding facility in Richmond, Québec. The Camoplast system was designed and installed by Claude Menard, president of Formatrix 67 General Contracting in Sherbrooke, Québec. The key component of the Camoplast system is a 160-ton Daikin WGS water-cooled screw compressor Model WGS chiller.

Winning combination: Formatrix 67 and Daikin

Menard knew the benefits of Daikin chiller technology after having worked with the company's equipment for more than 20 years. "Daikin makes very reliable and easy-to-service chillers," he says. A few years ago, Menard became familiar with Daikin's watercooled screw compressor chillers and began applying the Daikin WGS chiller in systems, including the upgrade at Camoplast. Francois Filion, process development manager at Camoplast, says the system upgrade project sold itself based on the system payback and the ease of installation. "It wasn't a big issue to install the chiller. The plant was down for only 72 hours and the entire project took about two months, start to finish," Filion says. Previously, a new chiller was added at the plant each time additional capacity was required. As a result, eight small chillers were located throughout the plant, totaling 175 tons of capacity.

"We selected a Daikin screw chiller that provides 205-tons of capacity. Using just half of that capacity at about 110 tons produces enough chilled water for the manufacturing needs of the whole plant," Menard says. The Daikin screw chiller replaced the eight small chillers during the upgrade project. It is used exclusively to cool water for industrial processes. The new chiller, located in the mezzanine area overlooking the shop floor at the Camoplast plant, produces process water at a setpoint temperature of 55 degrees Fahrenheit used in two injection molding processes that are critical to the company's operations.

"The chiller is used for the hydraulic section of the industrial process in the summer. During the winter, the cooling tower is doing free cooling," Menard explains. For maximum efficiency, the temperature of the water is modulated from 75 degrees Fahrenheit to 85 degrees Fahrenheit at the exit of the plant's 400-ton cooling tower which was installed concurrently with the new chiller.

Menard says the design of the Daikin WGS chiller with its dual refrigerant circuits results in excellent part-load efficiency and reliability. "With the WGS, it's like having two chillers side by side on the same frame. The entire unit is split. The refrigerant side is split with two separate condensers and one evaporator that is separated into two sections. If there is any problem with one of the compressors, you use the other one," Menard says.

HFC refrigerant a “must have”

According to the Daikin sales representative at Enviroair Industries, Inc. in Montreal, Quebec, features of the WGS chiller such as the extremely quiet operation of the chiller with its soft-start solid state starter and compact design make it the best chiller in its class. “The HFC-134a refrigerant in the Daikin screw chiller was a must,” he adds. “The owner wanted a refrigerant that didn’t have a phase-out schedule so they wouldn’t have to worry about retrofitting it in the near future when HCFC refrigerants will be phased out.”



The Daikin water-cooled screw compressor Model WGS Chiller installed at the Camoplast automotive component injection molding facility is part of the energy award winning system that reduced annual energy costs by 70%.

Quiet operation

With the chiller located in the mezzanine overlooking the shop floor in the production area of the plant, potential sound levels were a concern of the workers. Yet they were pleasantly surprised when they heard the quiet operation of the unit. Designed with a single main rotor compressor, which is inherently quieter than twin screw compressor designs, Daikin WGS chillers are ultra-quiet, providing sound pressure levels from 73 to 77 dBA per ARI Standard 575.

Soft-starts critical for control system

Another critical factor was the softstart at low capacity of each compressor of the chiller. The softstart capability keeps voltage fluctuations to a minimum and is key to the reliable, uninterrupted operation of more than 30 surgesensitive PLC (programmable logic controllers) in the plant control system. Camoplast uses Omron controls, and with the assistance of Menard, developed its own proprietary software to run the chiller and ancillary equipment, resulting in a completely automated plant.

Utility rebate increases savings

By specifying energy-saving systems such as that used by Camoplast, Menard has secured a number of significant grants for customers from Montreal, Quebec-based Hydro-Québec utility company. Hydro-Québec’s Empower Program for Industrial Systems incentivizes businesses to implement electricity-saving measures applicable to industrial equipment, systems or processes. “The program is ongoing through 2014,” Menard says. In addition to the funding awarded to companies that adopt energysaving equipment, the Empower Program for Industrial Systems also bestows “energy wise citations of excellence” for exceptional projects. Formatrix 67 received five out of 13 total citations awarded to contractors during the 2004 through 2007 period under the Empower Program. Out of the five citations for excellence, three of these awards involved Menard’s placement of Daikin equipment at Quebec industrial businesses.

Impressive return on investment

Project costs for the Camoplast system upgrade totaled \$270,000 Canadian Dollars (CAD) including the WGS chiller, cooling tower, valves and piping. Taking into account the \$171,000 CAD grant received from the utility company’s Empower Program, the total cost of the project was \$99,000 CAD. Prior to the project, Filion says the plant had approximately \$98,000 CAD in annual electricity costs, which has been reduced to about \$28,000 CAD annually. Menard noted the following breakdowns for specific savings: 30 percent, Daikin chiller; 50 percent from free cooling (during off-season, etc.); and 20 percent from pumps, piping, controls.

Maintenance cost savings a bonus

In addition to the dramatic savings in utility costs, Filion notes the company’s annual maintenance costs for the chiller and related equipment was reduced significantly from approximately \$30,000 CAD annually to about \$5,000 CAD annually. The Camoplast plant application is a great example of how businesses are saving money with innovative solutions and non-conventional uses of conventional technology like the Daikin WGS screw chiller. Not only do they help win awards, they also help businesses win the battle against high energy costs!



Claude Menard, president of Formatrix 67 General Contracting in Sherbrooke, Québec, and designer of the energy award winning system at the Camoplast facility.