Performance Boosting Additive

Commercial Benefits—Spinoffs

An inexpensive way to increase the performance of air conditioners, heat pumps, refrigerators, and freezers has found a home in the commercial sector, spurred into existence by the need to thermally control NASA spacecraft.

Through Small Business Innovation Research (SBIR) funds from the Goddard Space Flight Center, Mainstream Engineering Corporation of Rockledge, Florida, developed a chemical/mechanical heat pump. The system makes use of environmentally acceptable working fluids, in particular, non-ozone-depleting substances.

QwikBoost™, developed by Mainstream Engineering Corporation, is a refrigerant additive that increases cooling capacity.

As an indirect result of the SBIR-supported research, Mainstream Engineering has developed a unique, patented, low-cost refrigerant additive, called QwikBoost™. The product works by increasing the cooling capacity of the refrigerant. QwikBoost™ circulates through the refrigeration system in a manner similar to that of the lubricant. It has a high affinity for liquid hydrofluorocarbon and hydrochlorofluorocarbon refrigerants and also exhibits a significant heat of solution when mixed with them. This solution heat increases the available cooling capacity—the latent heat of the refrigerant during evaporation. Thus, the performance of the system is increased.

When production of ozone-depleting refrigerants was halted in the United States as part of the Environmental Protection Agency's Clean Air Act, affected units switched to another type of refrigerant. However, in doing so, these same units suffered a performance and efficiency reduction. Lower vapor-compression system efficiencies meant more electrical consumption resulting in the production of more power plant emissions.

QwikBoost™ has shown to be an environmentally safe fluid with zero ozone depletion potential, improving the performance of vapor-compression heat pumps, air conditioners, and refrigeration systems by as much as 20 percent. This results in a reduction in energy use and expenses for the equipment owners and a reduction in pollution generated by power plants.

QwikBoost™ is currently being marketed and sold in certain automotive air-conditioning systems and refrigeration units. The product is packaged in a 3-ounce can, pressurized with R-134a refrigerant. Once the additive is introduced into the system, it remains active for the life of the system and does not need to be replaced. An increase in automotive air-conditioning cooling capacity means faster car cool-downs and more cooling. This is a desirable attribute given the reduced capacities of new auto air-conditioning systems operating with or retrofitted to use R-134a refrigerant.

Testing of the product has shown that it will not adversely affect system lubrication or compressor life. Adding QwikBoost™ resulted in reduced wear properties compared to the lubricant alone. These tests also indicated that the product reduced the accumulation of wear metals in the lubricant.

Mainstream Engineering Corporation received the Tibbetts award from the Small Business Administration during an October 1997 White House ceremony for its commercialization of the performance enhancing additive technology.

Future use of QwikBoost™ appears bright, as residential and commercial air-conditioning and refrigeration systems will undoubtedly face regulations to reduce energy consumption. This additive offers a fast, easy, and inexpensive way to meet these future goals.

Meanwhile, new military and NASA units that take advantage of QwikBoost™ will be more efficient, smaller, and lighter—all desirable features for aircraft and spacecraft applications. ❖

QwikBoost™ is a trademark of Mainstream Engineering Corporation