DESIGN AND EXPERIMENTAL ANALYSIS OF A CARBON DIOXIDE TRANSCRITICAL CHILLER FOR COMMERCIAL REFRIGERATION

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ABSTRACT

The development of refrigerating units operating by natural working fluids is a topical challenge for refrigeration companies. Carbon dioxide is an interesting solution for commercial refrigeration and in prospective for air-conditioning systems. Because of its low critical temperature, CO2 main drawback is its low cycle energy efficiency. Thus the refrigerating machines operate according to a transcritical cycle, also for relatively low temperature of the hot sink. SCM Frigo carried out a research project concerning the development of a carbon dioxide transcritical chiller for refrigerating propylene glycol down to -8 °C. The aim of the project was the optimization of the cycle efficiency and the minimization of installation and managing problems of the unit. To develop an high efficiency unit, outstanding component manufacturers were involved. The whole project was coordinated by the University of Padova. Several experimental tests were carried out, testing the chiller at external temperatures ranging from 16 to 35°C.

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