



USING AIR-COOLED COPELAMETIC COMPRESSORS FOR LOW TEMPERATURE HCFC-22 APPLICATIONS

Introduction

The unique design features of air-cooled semi-hermetic compressors allow their reliable use with HCFC-22 in properly designed and tested low temperature applications. These features include a very large compressor surface to horsepower ratio which effectively dissipates the heat of compression through the compressor case. In addition, these compressors route all suction gas into the cylinders without any direct superheating by the motor. This is possible since the physically large efficient 4-pole low horsepower motors effectively dissipate their heat through the motor casing.

On K models, the low pressure positive displacement oil pump previously used on some models is being extended to all models approved for use with HCFC-22 to guarantee satisfactory lubrication under all load conditions.

Application Guidelines

The application envelope for these models are shown in the product performance literature. Since the compressors are primarily cooled by heat transfer from their external surface, they must have positive air flow whenever the compressors are operating in order to guarantee safe operating temperatures. The required air flow can be provided by a condenser fan of adequate size blowing on the compressor or by a separate fan which provides the required air flow. These fans must operate whenever the compressor operates, even under winter operating conditions.

Air flow requirements for each model are detailed in Table 1.

Design Cautions

Using HCFC-22 in low temperature applications reduces the safety margin system designers had with

CFCs 12 and 502. There should be no decrease in reliability with HCFC-22 as long as the systems are properly designed and maintained. Installation problems, failure of other system components such as TXVs or condenser fans, poor maintenance (clogged condensers or operation with low system charge) or any other condition which leads to excessive suction gas superheat or discharge pressure can result in excessive discharge and/or oil temperatures which may substantially shorten compressor life. Special controls to warn of dangerous system conditions (clogged condensers, high discharge line temperatures, low suction pressure, high discharge pressure) may be appropriate to ensure long term reliability.

Elimination of suction to liquid line heat exchangers may be required to avoid excessive superheating of the return gas. Also, consideration of use of an accumulator should be made to avoid excessive return of liquid refrigerant after defrost. This could occur because the heat of vaporization of HCFC-22 is substantially higher than that of CFC-502.

Field Conversion of CFC-12 and 502 Units to HCFC-22

The air-cooled semi-hermetics described in this bulletin are specifically intended to be used by OEMs for new system designs only. They are not intended for use in field conversions of systems from CFC-12 or 502 to HCFC-22. Such field conversions are specifically discouraged by Copeland for reasons outlined in Copeland Application Bulletin AE 17-1284, Switching Refrigerants in Field Installations.

TABLE 1

Compressor Horsepower Rate	Minimum Air Flow (CFM)
Below 3 HP	650 (Horizontal)
3 HP and Above	1000 (Vertical)

