Discharge Line Mufflers

The noise characteristics of a large refrigeration or air conditioning system, particularly when installed with long refrigerant lines and remote condensers, are not predictable. Variations in piping configuration, the pattern of gas flow, line sizes, operating pressures, the compressor and unit mounting, all can affect the noise generated by the system. Occasionally a particular combination of gas flow and piping will result in a resonant frequency which may amplify the sound and vibration to an undesirable level. Gas pulsation from the compressor may also be amplified in a similar manner.

If gas pulsation or resonant frequencies are encountered on a particular application, a discharge line muffler may be helpful in correcting the problem. The purpose of a muffler is to dampen the pulses of gas in the discharge line and to change the frequency to a level which is not objectionable. A muffler normally depends on multiple internal baffles and/or pressure drop to obtain an even flow of gas. In general, the application range of a muffler depends on the volume and density of the refrigerant gas discharged from the compressor. Both are factors in muffler performance.

A given muffler may work satisfactorily on a fairly wide range of compressor sizes, but it is also quite possible that a given system may require a muffler with a particular pressure drop to effectively dampen pulsations. On truly problem applications, trial and error may be the only final guide. While larger mufflers are often more efficient in reducing the overall level of compressor discharge noise, in order to satisfactorily dampen pulsations, smaller mufflers with a greater pressure drop are usually more effective. Adjustable mufflers are often helpful since they allow tuning of the muffler pressure characteristics to the exact system requirement.

Table 1 lists mufflers manufactured by Refrigeration Research, Brighton, Michigan, which have been applied satisfactorily within the recommended capacity range. The size suggested will normally smooth out pulsations and reduce noise on most systems, but the exact performance on a given system can only be determined by actual tests under normal operating conditions.

Compressor Muffler Plates

Occasionally, a combination of operating conditions, mounting and piping arrangement may result in a resonant condition, which tends to magnify compressor pulsation and cause a sharp vibration, although noise may not be a problem. For larger Copeland® compressors, discharge muffler plates have been developed for use when necessary to dampen excessive pulsation. The muffler plate fits between the discharge valve and the compressor body and has a number of muffling holes to provide the proper characteristics for the particular compressor displacement. The muffling holes break up the pattern of gas flow and create sufficient restriction to reduce the gas pulsation to a minimum.

Muffler plates are provided as standard equipment on two stage compressors. Table 2 lists muffler plates available should they be required.
Table 1
(Tentative Selection Only - Exact Performance Must Be Determined by Test)
Refrigeration Research Mufflers

Discharge Mufflers

Table 2
Discharge Muffler Plates