

where vibration is otherwise a problem. Packed or packless shut-off valves are necessary where it may be required to isolate portions of a system.

EQUIPMENT CHARACTERISTICS AND SELECTION

The various types of compression systems have quite different characteristics of capacity and power with varying evaporator and condenser temperatures, as may be noted from curves in Figs. 12 and 13.

From Fig. 12 it may be observed that power requirements for the centrifugal compressor increase much more rapidly than for the reciprocating compressor, with increase in evaporator temperature. Similarly, the

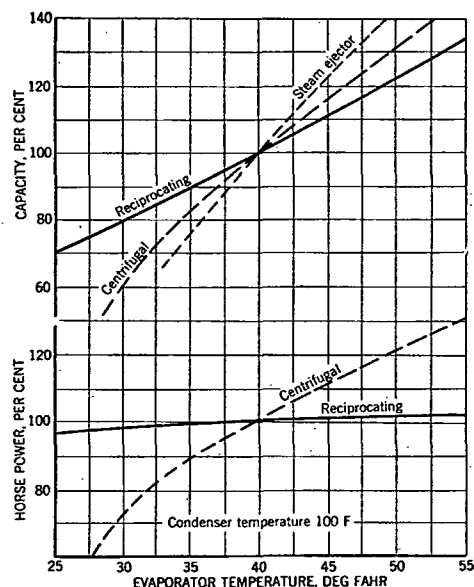


FIG. 12. PERFORMANCE CHARACTERISTICS OF COMPRESSION REFRIGERATION MACHINES AT CONSTANT SPEED

capacities of the steam ejector and centrifugal compressors increase more rapidly than those of the reciprocating compressor with increase in evaporator temperature. Thus, both the steam jet and centrifugal machines tend to be more self-regulating than the reciprocating. It is also evident from Fig. 12 that the steam jet equipment is best suited for operation at high evaporator temperatures.

The effect of condenser temperature upon the power and capacity of the different types of compressors is shown in Fig. 13. It may be noted that the power required by the reciprocating compressor increases rapidly with increase in condenser temperature, while the power curve for the centrifugal compressor is relatively flat. It is also evident that the capacity of the steam jet compressor is independent of condenser temperature until a certain point is reached, where it drops to zero. As previously

stated, steam jet equipment requires more condensing water than other types of compression systems. Consequently, steam jet systems are well suited to those applications where condensing water is cheap, or where condensing water is rather high in temperature.

The selection of proper refrigeration equipment for any air conditioning job is of utmost importance for satisfactory results. The most important factors in the selection of the equipment are:

1. Loads (as determined by the conditions of the space to be cooled).
2. Economics (both initial and operating costs).
3. Codes (local safety codes must be adhered to and influence the type of system to be used).

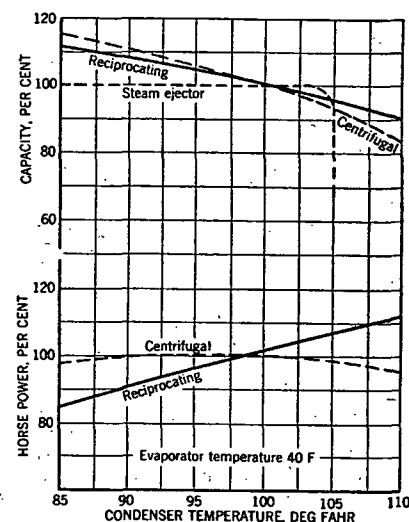


FIG. 13. PERFORMANCE CHARACTERISTICS OF COMPRESSION REFRIGERATION MACHINES AT CONSTANT SPEED

A broad division of equipment to be used for a particular installation or application may be made on the basis of the magnitude of the load. Current general practice is outlined in Table 8.

Unit or *packaged* systems, consisting of a reciprocating compressor, condenser, evaporator, and fans, are generally used in the smaller sized jobs where electric power is available, as they are manufactured complete, ready to install, and are the most economical (see Chapter 25).

The reciprocating compressor in the built-up central system (see Chapter 29) covers the widest range of application since it is applicable to either the direct expansion or indirect systems, and can be driven by steam or gas engines, or by electric motors. The quantity of condensing cooling medium required is also less than for any other system, with the exception of the centrifugal compressor, which uses the same amount.

Centrifugal compressors are used for large installations, and usually where the indirect system is required. The driving mechanism can be a