performance possibilities, they may be considered to be representative of sound design and application practice.

Performance data for standard production designs of silica gel *rotating bed* dehydrators are shown in Fig. 7 for a *direct gas fired type*, and in Fig. 8 for *steam activation* types for steam pressures of 5 to 80 lb per square inch. They are designed for normal comfort cooling and moderate humidity industrial air conditioning applications. Performance data for a *heavy duty type activated alumina* dehydrator are given in Fig. 9. This unit has extended surface coils, imbedded in the adsorber, which are supplied with high pressure steam for heating during activation and cool

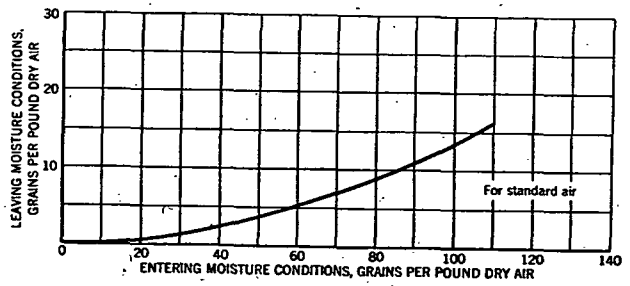

FIG. 9. ACTIVATED ALUMINA DEHYDRATOR PERFORMANCE DATA HEAVY DUTY TYPE

water for direct bed cooling during adsorption. Capacities shown in Fig. 9 are based upon 75 F cooling water. Performance data for a *standardized package lithium chloride* dehydrator are shown in Fig. 10. This is a single unit including both absorption contactor and regeneration section together with necessary heat exchangers.

COMPARISON OF DEHYDRATION AND DEHUMIDIFICATION

Almost all summer comfort air conditioning, as well as much industrial and commercial air conditioning, requires both of the functions of sensible and latent heat removal from air. Each of the methods of cooling and dehumidification has as its objective either the removal of sensible or latent heat, or both simultaneously. Choice of method and medium therefore depends solely on whether (*a*) method and medium are physically able to accomplish the desired result with practical equipment, and (*b*) method and medium are justifiable economically.

Referring particularly to the problem of moisture removal, it may be stated that either dehumidification using chilled water, brine or direct expansion refrigerant, or dehydration using solid or liquid agents, is *equally practical* from the viewpoint of engineering performance for the vast majority of comfort and for a great many industrial applications requiring dew-point temperatures above 45 F.

For this reason, in the normal operating range, consideration is usually based upon practical factors which affect the over-all economics of the

situation or upon the desire or necessity of attaining independent control of either temperature or humidity. In this connection, it should be remembered that though a satisfactory balance may exist between cooling and dehumidification requirements at maximum design conditions, there are many periods when practical operating conditions will result in an

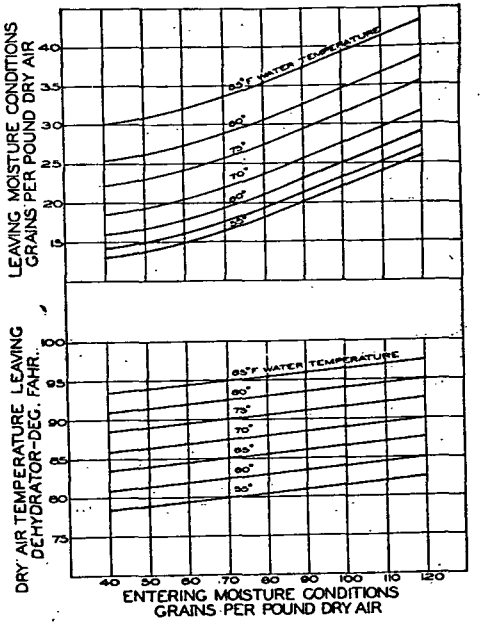

FIG. 10. LITHIUM CHLORIDE DEHYDRATOR PERFORMANCE DATA

unsatisfactory balance of sensible and latent loads unless there is a simultaneous use of cooling and reheating.

In the normal range the choice between dehydration, mechanical refrigeration, natural cold water, or ice, must be justified by the initial investment of available equipment; the availability and cost of prime energy sources; the charges to be allocated to space occupied, labor of operation and maintenance; and the degree of control required.

When required dew-point temperatures are below 45 F dehydration deserves special consideration, as it does in applications where the task is primarily one of moisture removal with no necessity for sensible temperature reduction.

It is evident that it is not possible to set forth definite rules governing the choice of dehydration equipment in preference to other methods of dehumidification. It is only possible to state certain general conditions which tend to make dehydration favorable or unfavorable.