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

COMPARISON OF METHODS OF 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 dehumidification either by using chilled water, brine or direct

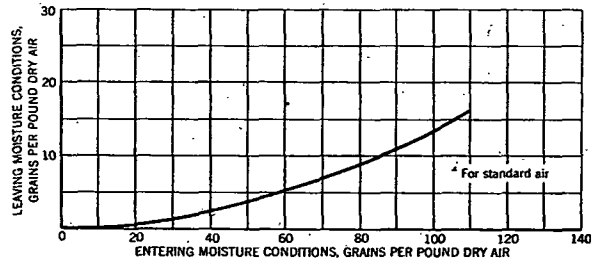

FIG. 9. ACTIVATED ALUMINA DEHUMIDIFIER PERFORMANCE DATA HEAVY DUTY TYPE

expansion refrigerant, or by using solid or liquid drying 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 unsatisfactory balance of sensible and latent loads unless there is a simultaneous use of cooling and reheating.

In the normal range the choice between direct or chemical dehumidification, 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, direct or

chemical methods deserve special consideration, as they do 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 the method of dehumidification. It is only possible to state certain general conditions.

Sorbent methods tend to be favorable where:

1. Low temperature water is available (below 65 F), to meet sensible cooling requirements.

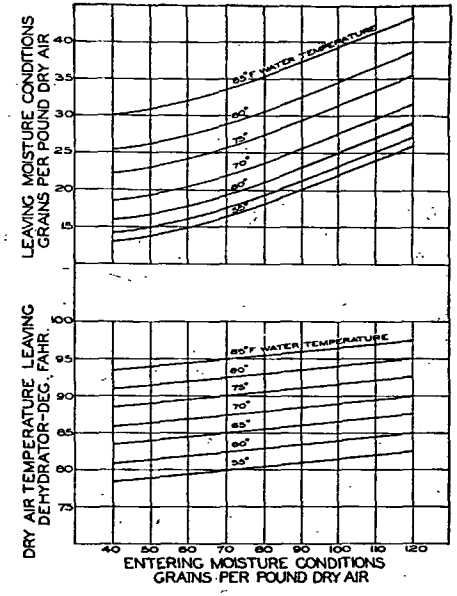

FIG. 10. LITHIUM CHLORIDE EQUIPMENT PERFORMANCE DATA

2. Gas or steam is available at costs competitive with electricity.

3. Abnormally high internal latent heat load is encountered.

4. Abnormally low dew-points are required (40 F or lower).

5. Required dry-bulb temperature is high or control of temperature is unimportant in comparison to maintenance of proper humidity.

6. In low temperature dryers where complementary heat exchange can be utilized. (In such cases the sensible heat of the dry air is reduced by the evaporation of moisture from the product being dried.)

Of the factors enumerated, Item 1, coupled with Item 2, tends to have the greatest influence since these factors affect the applicability to normal range requirements. However, each of the items listed has a direct influence upon economic considerations.