by precooling the brine in the solution cooler to a predetermined temperature, which is usually below that of the air, by city, well or chilled water.

The excess water of condensation, which dilutes the brine, is removed in the solution concentrator. This is a low pressure steam heat exchanger which over-concentrates a portion of the weak liquor and returns it to the main brine reservoir for re-pumping. The concentrator operates in the manner of an evaporative condenser, whereby moisture is evaporated from the brine by the heating coils into a stream of regeneration air, taken

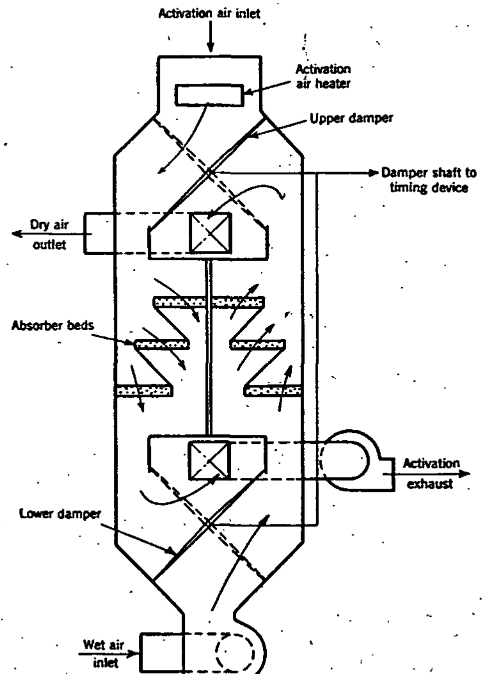

Fig. 5. Solid Adsorbent Dehydrator—Stationary Bed Type

from and rejected to the outside atmosphere. Low pressure steam is normally used for heating the brine. When it is desirable or necessary to use gas or electricity, an auxiliary low pressure steam boiler is usually added to the equipment. Concentrators operating on a simple boiler principle have not as yet been commercially practical.

It should be noted that the solution concentration phase is the reverse of the dehydration process. During concentration the aqueous vapor pressure of the solution is greater than that of the surrounding air, while during dehydration, the reverse is the case. Utilization of this principle permits winter humidification, by heating (instead of cooling) the solution pumped to the contactor. Water is thereby evaporated into, instead of

condensed out of, the conditioned air stream. This requires dilution of the brine externally to the contactor, rather than concentration.

Another type of liquid dehydrator utilizes an integral interchanger which employs the same type of solution concentrator as described for the system with the external interchanger. However, the dehydration contactor and solution cooler are combined by placing a cooling coil directly in the wet air stream. This coil provides the contacting surface between air and the warm concentrated solution which is sprayed over the cooling surface. By circulating a cooling medium through this coil, control of solution temperature (hence its vapor pressure) is accomplished directly in the air stream.

ESTIMATING OF LOADS

Where equipment is used which removes sensible and latent heat simultaneously such as a chilled water or direct expansion dehumidifier,

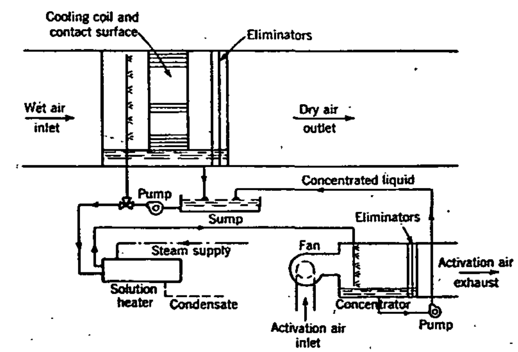

Fig. 6. Liquid Absorbent Dehydrator in Which Solution Cooler and Contactor are Combined

the basis of selection is usually the *maximum total heat load*. The operating characteristics of such equipment normally produce satisfactory dew-points with adequate capacity at other loads, including the maximum latent load which occurs at a less-than-maximum total load. With dehydration equipment in which moisture removal is achieved independently of sensible cooling, it is necessary that equipment be chosen for the maximum load of each functional element. The sensible cooler should be selected for the maximum sensible load; the dehydrator for the maximum latent load. These loads need not occur simultaneously, and in fact, rarely do.

In estimating the maximum latent heat load for comfort applications, it is considered good practice to select an outside design dew-point for the locality which is exceeded on not more than 5 per cent of the days during the season. A smaller percentage, or even the maximum dew-point recorded, may be advisable for rigorous industrial applications.

Due consideration should also be given to moisture seepage through building materials and vapor infiltration through openings. These items