

it incurs the risk of leakage, drip, or coarse spray which cannot be permitted when water is supplied by aspiration.

In the turbo humidifier, the atomizer proper consists of only two parts which can be separated and reassembled without the use of any tool other than a wrench. The parts register in one position only, so that all necessity for adjustment is avoided. The jet of spray has a slight rotation which insures immediate separation of the particles of moisture, thus preventing any tendency toward precipitation. The spray issues from a single outlet in a flat surface so that deposits of lint cannot cause drip or interfere with operation.

High Duty Humidifiers

In the high duty humidifier, water is supplied under high pressure (ordinarily about 150 lb per square inch) through pipe lines from a centrally-located pumping unit. Each humidifier contains a spray generating nozzle of the impact type, located in a cylindrical casing. Below is a drainage pan to provide for the collection and return of unevaporated water which flows through a return pipe to a filter tank, from which it is recirculated. A fan mounted above propels a powerful air current through the humidifier.

The shape and relative positions of the casing and pan are such that only the finest spray escapes. The warm and relatively dry air enters from above, is drawn through the head, charged with moisture, and cooled to the wet-bulb temperature. It escapes from the annular opening below at high velocity in a complete and nearly horizontal circle. The spray is quickly evaporated and the resulting vapor is rapidly and thoroughly diffused.

This effective distribution of fine spray over the maximum possible area insures complete and extremely rapid vaporization even at the highest humidities. The quality of the spray is finer and the evaporative capacity is greater than that of any other type of humidifier suitable for local distribution.

The fan is propelled by a direct-connected electric motor. Different models of this humidifier, all of the same general type, are used for different conditions so that the evaporating capacity and area of distribution may be adapted to the factory requirements.

High duty humidifiers are suspended from factory ceilings and are so located as to insure widespread and uniform circulation and the best possible humidity conditions. Units of exceptionally high capacities are used where the requirements are most severe, and units of smaller capacities are installed in relatively larger numbers when high humidities are required at more moderate temperatures.

The air is thoroughly cleaned during its passage through the humidifier by intimate mixture with the spray. Dust, lint, and bacterial atmospheric impurities are thus precipitated into the drainage pan, passing with the unevaporated water through the return piping to a centrally-located tank. Here all foreign matter is removed by a gravel bed filter and accumulated impurities are rejected to waste by periodical washing and flushing. Fresh water to replace evaporation is constantly added to the purified return water, which is redistributed to the humidifiers by

means of a circulating pump at the necessary pressure. In winter, steam under control of a thermostat is usually admitted to the tank so that the circulated water may be held at any desired temperature.

Occasional flushing of the main filter is necessary to remove accumulations of lint which gradually collect in the humidifier casings. The fan motors require occasional renewal of their oil supply.

Spray Humidifiers

The so-called spray humidifier comprises an impact spray nozzle in a cylindrical casing with a drainage pan below it. The aspirating effect of the spray nozzle induces a moderate air current through the casing which distributes the entrained spray. The general method of circulating and returning the water is similar to that employed for high duty humidifiers. A suitable pump and centrally-located filter tank are required.

The spray type of humidifier and the high duty humidifier have many features of resemblance but the latter because of its finer spray and greater capacity is often considered better adapted for producing the higher humidities which modern practice demands.

Centrifugal Humidifiers

There has always existed a demand for a self-contained humidifier, that is, one having the ability to generate and distribute spray without the use of air compressors, pumps, or other auxiliaries. A humidifier of such characteristics is naturally convenient for a small installation where few heads are required.

These humidifiers are generally of two types. One type operates under low water pressure and evaporates about 20 per cent of the water fed to it; the other maintains a constant level in the bottom of the humidifier and may be arranged to evaporate all the water fed to it. Both types generate spray from water thrown from the surface of a revolving disc in a complete, horizontal circle.

When centrifugal humidifiers are used in laboratories or rooms where little or no dust and lint are present, they may be supplied with water by gravity through a single pipe which maintains water in a pool in the bottom of the pan at a constant level. Such an arrangement is not satisfactory in factories where the air washing action of the humidifier results in the rapid accumulation of precipitated dust, lint, or other impurities in the drainage pan.

Removal of Impurities

In textile mills, the continuous removal of impurities is one of the recognized functions of the modern humidifier. This is accomplished by supplying water through one pipe line and carrying away the unevaporated water and its entrained impurities through another. The drainage water may run to waste if the system is small and the water supply ample and inexpensive. When the cost and quantity of the water require economy, the drainage water may be collected, filtered, and recirculated from a filter tank in which impurities are removed. The purified return water is lifted by a pump to a small reservoir for gravity supply to the humidifiers.