Condensate Drain Trapping

Most evaporator coils are located in such a way that the supply air is drawn through them. Therefore, the condensate comes into an area of low static pressure. If the pressure in the area is not equalized, the condensate will accumulate in the drain. This could eventually splash out and leak into the supply duct or the bottom of the unit causing water damage in the building below. Therefore, a trap should be installed to prevent condensate buildup. See Figures 8-2 and 8-3 for suggested trap design. It may be necessary to fill the trap manually on startup or run the unit for a while and then turn it OFF, allowing the trap to fill. During the winter months, an antifreeze solution should be placed in the trap, or the trap should be drained and plugged.

Some have the misconception that “a good, deep trap” is a cure-all for most trapping situations. Unfortunately, visual estimates and arbitrary trap heights can result in trap failure. The dynamics of ‘blow-through,’ or positive pressure, and ‘draw through,’ or negative pressure, systems result in differing trapping solutions. However, the fundamentals are the same. In some situations, the base may not provide enough height to allow a proper condensate drain design. In this situation the trap should be continued into a pit or if a pit is not an option the AHU assembly should be place on a curb, concrete pad, or other solid structure to provide adequate height for proper trapping.

In a positive pressure situation, the fan forces air through the cooling coil, with the condensate pan on the leaving air side. The trap must be of sufficient height to allow the pan to drain completely when the static pressure in the unit is at normal operating conditions. Figure 8-2 indicates dimensions for a properly constructed positive pressure trap.

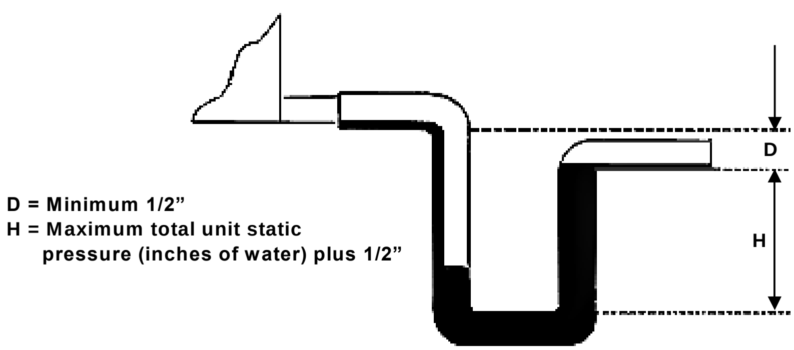

Figure 8-2 Positive Pressure - Condensate Drain

In a 'draw-through' system, the fan pulls air through the cooling coil. Since the condensate drain pan is on the fan side, there is a negative pressure at the drain relative to pressure outside the unit. Here, also, the trap height must be calculated based upon unit static pressure, but in the reverse direction. Worst-case static pressure conditions, like those caused by dirty filters, dirty coil, or increased fan speed, must be used for calculating the correct trapping height. If the trap isn't deep enough, the water seal won't hold, and air will be drawn through the drainpipe into the system. If too deep, water will back up into the system. As condensate forms during normal operation, the water level in the trap rises until the draw rate is steady. Figure 8-3 indicates dimensions for trapping a negative pressure system.

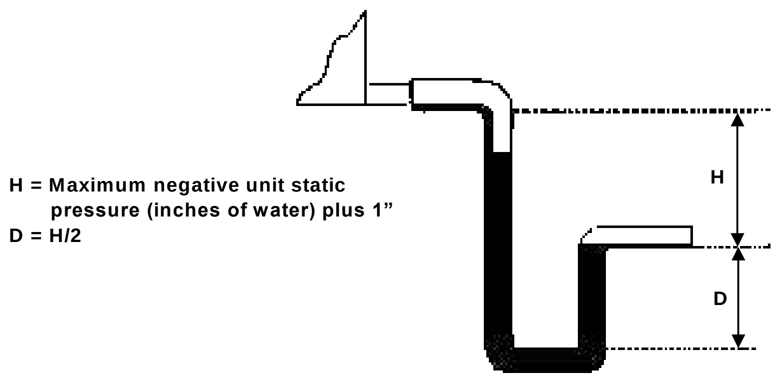

Figure 8-3 Negative Pressure - Condensate Drain