

Poultry Housing Tips

Five Significant Differences Between Plastic & Paper Pads

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Interest in plastic evaporative cooling pads has been steadily increasing since their introduction approximately ten years ago, especially for producers with water quality issues. Though for the most part six-inch plastic pads are interchangeable with six-inch paper pads, and can produce similar cooling, this doesn't mean there are not significant differences between plastic and paper pads. Not taking into account these potentially important differences can result in an increased likelihood of heat-stressed birds and wet litter in houses equipped with plastic pads.

1) Plastic pads are more prone to carry water into pad rooms. The flutes (the holes which air passes through) in plastic pads tend to be U-shaped and are much larger than those in traditional pads. Paper pads have alternating 45° and 15° flute angles. The 45° flutes are sloped downward toward the outside surface of the pad which helps to keep most of the water on the outside surface of the pad. The inside surface of a paper pad will be damp, but there will be essentially no water flowing over the surface. In contrast, air flow through the large U-shaped flutes tends to pull water from the outside surface of the pad to the inside surface of the pad, resulting in a substantial amount of water flowing over the inside surface of the pad (Figure 3). Large water droplets collect on the inside surface of the pad which tend to be blown into the pad room, causing water to collect on the pad room floor (Figures 1 and 2). Though this is not necessarily a major problem for houses with pad rooms, it can result in significant litter wetting if the pads are installed directly on the side of a house. For this reason it is not generally advisable to install plastic pads in systems mounted directly on the side wall of a poultry house.

2) Plastic pads are more difficult to wet than paper pads. Because plastic pads do not wick water, to insure the entire pad is thoroughly wetted, the amount of water circulated over the pad needs to be greater than with traditional paper pads (ie. twice as

much). For this reason, reduced water flow over plastic pads will tend to result in a greater reduction in cooling than with paper pads. Many older distribution systems are likely incapable of supplying the higher volume of water flow required of plastic pads and/or doing so without producing a significant amount of water wastage.



Figure 1. Dry pad room floor in house with paper pads



Figure 2. Wet pad room floor in house with plastic pads



Figure 3. Large water droplets being pulled into the pad room by air flowing through relatively large U-shaped flutes

3) Plastic pads dry out much faster than paper pads. Paper pads tend to have more internal surface area than plastic pads and have the ability to soak up

and retain a relatively high volume of water. The combination of these two factors means that when wetted, paper pads can hold more water than plastic pads. The reduced water-holding capacity of plastic pads means that when the circulation pumps turn off, plastic pads dry out faster than paper pads. Whereas it typically takes 30 minutes or more for a wetted paper pad to dry out, preliminary studies have found plastic pads dry in one-half to one-third of the amount of time (Figure 4). Since plastic pads dry out faster, the cooling they produce will be more affected when controlled by a ten-minute timer than paper pads. As a result, managers may find that operating plastic pads using a timer is counterproductive.

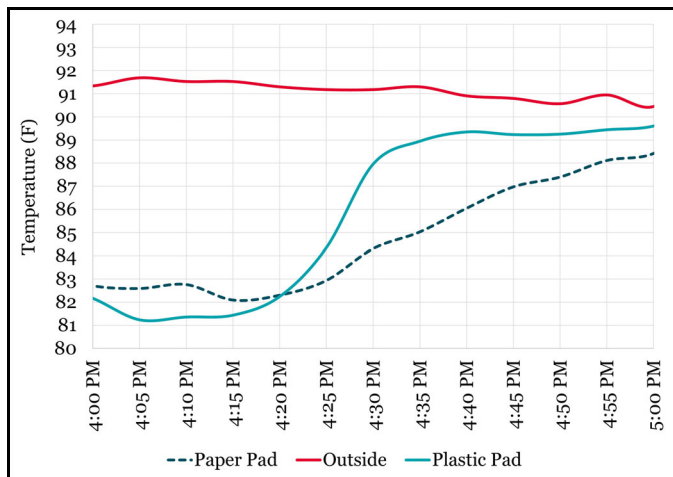


Figure 4. Incoming air temperature in adjacent houses with paper and plastic pads, circulation pads turned off at 4:15 pm

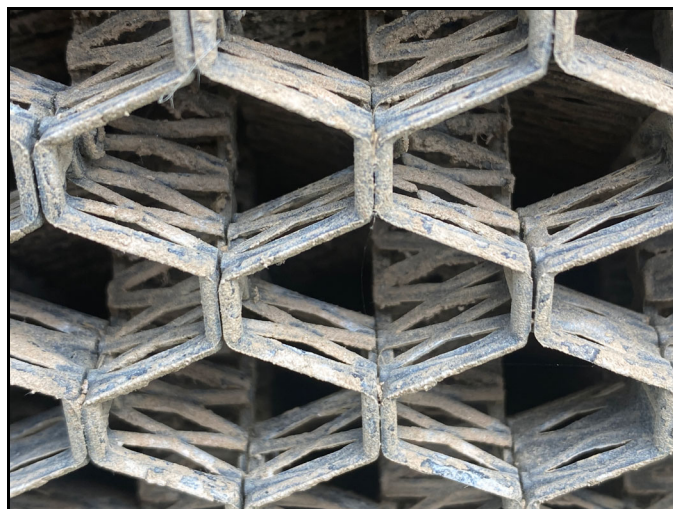


Figure 5. Dirt/mineral accumulation on plastic pad surfaces

4) Plastic pads are not as standardized as paper pads. For the most part, six-inch paper, 45° X 15° flute angle pads are constructed very similarly and as a result are interchangeable. There can be

significant differences between plastic pad construction and materials which could affect both the static pressure and cooling associated with each manufacturer. As a result, it is very important when considering using plastic pads that the manufacturer of the plastic pad provides test data showing that the cooling efficiency and static pressure associated with the pad they are selling are similar to that of traditional six-inch paper pads.

5) A little dirt on plastic pad surfaces can be of benefit. Because paper pad flutes are fairly small, dirt/minerals collecting on the interior surfaces can quickly increase static pressure the tunnel fans are working against which in turn can reduce air speed. Since the flutes are larger on plastic pads, a little dirt on interior flute surfaces doesn't affect the static pressure as greatly. In addition, a slight dirt/mineral coating on plastic pad surfaces tends to make it easier for the water to wick throughout the pad, thereby aiding cooling (Figure 5). Research has shown that the dirt and minerals that tend to collect on pad surfaces over time tend to increase the cooling produced by plastic pad systems. But, like paper pads, if dirt/mineral accumulation becomes excessive on pad surfaces, house air speed and therefore bird cooling can be significantly reduced.

Plastic evaporative cooling pads have proven to be a viable option for use on poultry houses provided producers understand there are characteristics of plastic pads that need to be taken into account to insure that bird cooling will be maximized during hot weather. If the pads are properly wetted, installed in a traditional pad room, and special attention taken if their operation is controlled using an interval timer, conditions within a house should be similar to those produced by a traditional paper evaporative cooling pad system. Whether the additional cost of plastic pads has a good return on investment depends to a large extent on the quality of water circulating over the pads. Quite simply, the poorer the water quality on a farm, the more likely a plastic evaporative cooling pad will make economic sense.

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