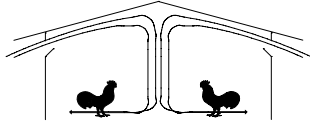




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# Poultry Housing Tips

## *Six-inch Pad System Water Usage and Pipe Sizing*

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One of the keys to making sure you can keep your birds cool during hot weather is to make sure that you have sufficient water capacity. Insufficient water in a broiler house can result in significant economic losses not only from not having enough water for bird consumption but not having enough water to keep the birds cool on hot days. Though the birds in a modern broiler house can drink a significant amount of water, the biggest user of water is a house's evaporative cooling pad system. Evaporative cooling pad area is based on the amount of fan power in a house. The greater the fan power, the more pad required, the higher the amount of water used. Over the years water usage has increased on many farms due to the fact that we are putting in more air moving capacity in an effort to obtain higher air speeds to produce the cooling required for many of the larger birds that producers are growing today.

Tunnel CFM (@ 0.05")	4' pad	5' pad	6' pad
180,000	65	51	42
200,000	72	57	47
220,000	79	62	51
240,000	86	68	56
260,000	94	74	61
280,000	101	79	65
300,000	108	85	70
320,000	115	91	75

Figure 1. Minimum 6" Evap. Cooling Pad Length (feet per side).

### PUTTING KNOWLEDGE TO WORK

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Ten years ago many new 40' X 500' houses had approximately 180,000 cfm of tunnel fan capacity requiring around 50' X 5' of 6" pad on each side of the house. Today, a new 50' X 500' broiler house can have well over 280,000 cfm of exhaust fan capacity requiring approximately 80' X 5' of 6" pad on each side of the house. The increased fan capacity and pad area has increased pad system water usage from 4.5 gals/min on a hot humid day (90°F, 50% Rh) to 7 gals/min (Table 2). Add to this a peak bird water usage in the neighborhood of 3 to 4 gallons per minute a modern 50' X 500' broiler house could require nearly 10 gals/min of well capacity. On a hot, dry day (105°F, 20% Rh) the pad system water usage can increase dramatically (Table 3) increasing total peak water usage to nearly 20 gals/min. Though this level of water usage may only last an hour or less per day the fact is that over the course of a day the pads on a modern 50' X 500' house can require nearly 9,000 gallons of water. With the birds drinking between 3,000 and 4,000 gallons that brings the possible total 24 hour water usage to 12,000 to 13,000 gallons.

Tunnel CFM (@ 0.05")	Gals/min
180,000	4.5
200,000	5
220,000	5.5
240,000	6
260,000	6.5
280,000	7
300,000	7.5
320,000	9

Table 2. Total 6" Pad System Water Usage on a Hot Humid Day (90°F, 50% Rh)

Tunnel CFM (@ 0.05")	Gals/min
180,000	9
200,000	10
220,000	11
240,000	12
260,000	13
280,000	14
300,000	15
320,000	16

Table 3. Total 6" Pad System Water Usage on a Hot, Dry Day (105°F, 20% Rh)

Tunnel CFM (@ 0.05")	Gals
180,000	3,300
200,000	3,700
220,000	4,100
240,000	4,500
260,000	4,900
280,000	5,300
300,000	5,700
320,000	6,100

Table 4. Potential Total 24 Hour Water Usage by a 6" Pad System on a Hot, Humid Day

Tunnel CFM (@ 0.05")	Gals
180,000	5,800
200,000	6,400
220,000	7,000
240,000	7,600
260,000	8,200
280,000	8,800
300,000	9,400
320,000	10,000

Table 5. Potential Total 24 Hour Water Usage by a 6" Pad System on a Hot, Dry Day.

Now of course, this is a worse case scenario with market age birds on a hot dry day. On a more typical hot humid day water usage would easily be less than half these values, but the fact remains that when determining how much water capacity a farm should have, it must be designed on worse case scenario.

Having enough well capacity is not the only thing to consider when it comes to assuring you have enough water to keep your birds cool. You have to have sufficient pipe size to get the water to the house, as well as, to the evaporative cooling pads. Using pipes that are too small in a water distribution system will result in an excessive pressure drop as you move from your well to the broiler house, which will reduce water flow to the house. Since water usage has significantly increased over the years the pipe sizes that were typically installed in the past may not be sufficient on many farms today. Table 6 provides a very conservative pipe sizing chart according to maximum water flow rate expected (Evaporative cooling pad water usage + bird water usage). Keep in mind that water has to be delivered to the evaporative cooling pad systems, which in many cases will require a one inch line on each side of the house (Table 7).

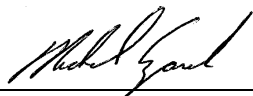
Flow Rate (gpm)	Pipe Size
5 or less	3/4"
10 or less	1"
20 or less	1 1/2"
40 or less	2"
80 or less	3"

Table 6. Ideal Pipe Size Based on Maximum Flow Rate.

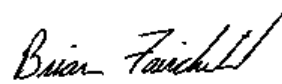
Tunnel CFM (@ 0.05")	Single PVC Pipe	PVC pipe per side
180,000	1"	3/4"
200,000	1"	1"
220,000	1 1/4"	1"
240,000	1 1/4"	1"
260,000	1 1/4"	1"
280,000	1 1/4"	1"
300,000	1 1/4"	1"
320,000	1 1/4"	1"

Table 7. Minimum Required Evaporative Cooling Pad Supply Line Based on Total Tunnel Fan Capacity.

When it comes to a house's water supply system, proper planning should be thinking not in terms of what will happen on the typical hot summer day, but what will happen in a worse case scenario-big birds and a hot, dry day. This deadly combination may not happen but once every five years, however if it does occur and you don't have enough water, the cost of putting in another well, or slightly larger supply pipes could seem minimal when compared to the production losses due to reduced growth and increased mortality.



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