

NPTC Tools of the Trade: Measuring Water Flow Rate

► Having enough water flowing into your poultry house is important to meet both the needs of your birds and those of the evaporative cooling system. Measuring the water flow rate will verify that you have enough water capacity and will also identify issues that might arise from closed valves, dirty filters, and clogged pipes.

Having enough water flowing into your poultry house is important to meet both the needs of your birds and those of the evaporative cooling system. Measuring the water flow rate will verify that you have enough water capacity and will also identify issues that might arise from closed valves, dirty filters, and clogged pipes. This publication outlines the steps for properly measuring water flow rate on your farm using either the **bucket test method** or a **water flow meter**.

Steps to Measure Water Flow Rate Using Bucket Test

- Gather the following tools as shown in figure 1:
 - Personal protective equipment (PPE), including safety glasses
 - A clean 5-gallon bucket, preferably white or transparent so you can see fill line mark
 - A stopwatch, timer, or smartphone to measure bucket fill time
 - Pliers (channellock, vice-grip, or equivalent) to help remove hose/valve connections
 - A short, large-diameter water hose to reach between the hose bib/valve and the bucket
Note: Do not use a hose 25 feet or longer as this will reduce the actual flow rate due to restriction from the hose.
- Put on your PPE, and ensure that any electrical appliances that could create shock hazards if water is sprayed across the room or drained on the floor are unplugged.
- Ensure that the main water valve to the house you are evaluating is turned on and is completely open (figure 2).



Figure 1. Tools needed to perform a water flow rate test.



Figure 2. Turn main valve on and completely open.

4. Identify the plastic or painted line fill mark on the 5-gallon bucket (figure 3).

If the bucket does not have a fill line, use a measuring pitcher to fill the bucket to 5 gallons, and mark the fill line, using a permanent marker (figure 4). Carefully empty the bucket, dry the inside, and then mark over the fill line a second time to improve its visibility (figure 5). If using a white or transparent bucket, make the first mark on the outside and then mark the inside.

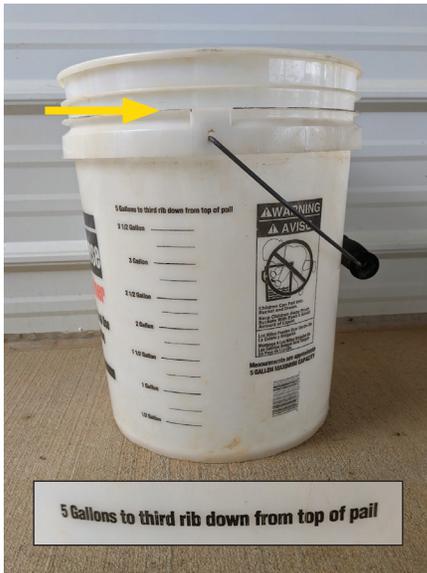


Figure 3. Yellow arrow shows the 5-gallon mark on this bucket. Beneath is the description of where the mark is located.



Figure 4. Using a gallon pitcher to identify where to mark for 5-gallons.



Figure 5. Use the top of the water line to mark the 5-gallon level.

5. Identify the hose bib/valve that you want to test.

For this test, we will be evaluating the flow rate going into a medicator (figure 6).



Figure 6. For this demonstration, the flow rate that is being evaluated is going into the medicator through a ball valve emphasized with the yellow arrow.

6. Position the bucket directly below the hose bib/valve being tested, and attach the water hose to the valve to prevent water from spilling and creating electrical safety hazards. Place the other end of the hose into the bucket (figure 7).

WARNING: Do not allow the water test hose to fall out of the bucket and shoot water onto the high voltage (120 to 230V) main electrical disconnects, panels, or other electronic controls or switches inside the control room as this could be a personal safety hazard, could cause loss of power to the flock, or both.



Figure 7. Use a short water hose to ensure all the water is flowing into the 5-gallon bucket.

Note: Do not use a hose that has a smaller diameter hose than the water line you are testing as this may restrict the flow rate and affect your reading (figure 8). Do not use a residential black washer hose or green garden hose jumper as they have a smaller inside diameter (ID). Certain hose bibs or faucets also restrict water flow regardless of nominal fitting size. See Extension publication ANR-2721, “Do Your Valves and Hose Bibs Restrict Water Capacity?” for details.



Figure 8. Medicator hose (1 1/16-inch ID), garden hose (5/8-inch ID), and residential washer hose (3/8-inch ID) showing the smaller hose diameters that can lead to restricted water flow.

7. Set your smartphone, stopwatch, or timer to record the fill time.
8. Have someone securely hold the hose in the bucket so it does not fall out during the flow test.
9. When ready, simultaneously open the hose bib or valve and start timing (figure 9).

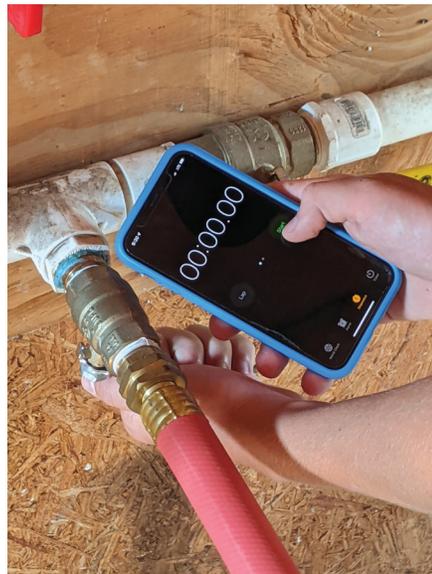


Figure 9. Turning on the water supply and starting the smartphone timer simultaneously.

10. When the water reaches the 5-gallon mark, first stop the timer, and then shut off the water supply (figure 10).



Figure 10. The smartphone timer shows the time it took to fill the bucket to the 5-gallon mark.

11. Using the **Water Flow Rate Worksheet** at the end of this publication, record the time it took to fill your 5-gallon bucket in question 6.

For this demonstration, it took 22.33 seconds to fill the 5-gallon bucket.

12. Convert the fill time from seconds to minutes by dividing by 60 seconds, and then write the answer in question 6 on the worksheet.

$22.33 \text{ seconds} \div 60 \text{ seconds} = 0.37 \text{ minutes}$

13. Divide the volume of your bucket by the time it took to fill it to determine the flow rate, and record the answer in question 7 on the worksheet.

$5 \text{ gallons} \div 0.37 \text{ minutes} = \text{a flow rate of } 13.5 \text{ gpm}$

Note: Consult your company for recommended flow rates for birds and equipment manufacturers for required flow rates for evaporative cooling systems.

14. Record all water sources that were running while you were performing this test in question 10 of the worksheet.

Note: The water flow rate will be highest when no other water systems are running from the same water supply system and will decrease as more systems demand water.

To measure the expected water flow rates during a flock, conduct the test when the water system is at its maximum and all water demands are running at full capacity. An example of a good time would be a day when the temperature is 95 degrees, large birds are drinking, and all of the evaporative cooling systems are running.

To evaluate how much flow you are losing to a dirty filter or a hose bib, measure the water flow rate before and after changing a dirty filter (question 8) or changing a hose bibb (question 9) to document any improvement.

Steps to Measure Water Flow Rate Using Water Flow Meter

1. Put on your PPE, and ensure that any electrical appliances that could create shock hazards if water is sprayed across the room or drained on the floor are unplugged.

2. Select a water flow meter that can be used with a garden hose fitting, ensuring that the maximum rated flow of the water meter is higher than the flow you expect from your system.

4 Alabama Cooperative Extension System

Note: The Fill-Rite TT10A flow meter (figure 11) used in this demonstration accurately measures water flow rates from 2 to 35 gpm. The meter costs approximately \$160 and has 1-inch threaded fittings that can be reduced to 5/8-inch garden hose fittings. This meter will record both water flow rate (gpm) and total water (gallons).



Figure 11. Fill-Rite TT10A series meter displaying the water flow rate at 13.02 gpm.

3. Securely connect your meter to the valve or water hose you are testing.

Note: It may be helpful to have a second short hose to install on the meter outlet to get the water out of the control room.

4. Turn on your meter to ensure it is working, and replace batteries if needed.

5. Turn on the water, and allow the meter reading to stabilize, which may take a few seconds.

6. Record the flow rate (gpm) in question 7 of the **Water Flow Rate Worksheet** at the end of this publication.

Note: Consult your company for recommended flow rates for birds and equipment manufacturers for required flow rates for evaporative cooling systems.

7. Record all water sources that were running while you were performing this test in question 10 of the worksheet.

Note: The water flow rate will be highest when no other water systems are running and will decrease as more systems demand water.

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The authors would like to thank fellow students **Baylor Arnold**, **Amanda Burgett**, **Abigail Lane**, **Juliana Rezek**, and **Leah Smith** for their assistance in this effort as part of the 2021 NPTC Research and Extension Experience for Undergraduates (NPTC REEU) Program.

For more information, contact your county Extension office. Visit www.aces.edu/directory.

This project was funded in part by USDA ARS project 58-6064-0-010, by the Alabama Agricultural Experiment Station, Auburn University, the Alabama Cooperative Extension System, and the Hatch program of the National Institute of Food and Agriculture, US Department of Agriculture.

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Water Flow Rate Worksheet

Make sure you have the main water shut-off valve and any additional valves in the pipe circuit fully open to prevent the restriction of water pressure and flow during this test.

Flow Rate Location: House 1 - Medicator Supply Date of Evaluation: August 1, 2021

Person Evaluating: John Chickengrower

Test Information

1. What method are you using to test? Bucket method Water flow meter
2. What is the size of your PVC piping? 3/4-in PVC 1-in PVC
3. What are you testing? dirty filter hose bib ball valve open pipe/hose
4. What are you using to time your fill rate? stopwatch timer smartphone

5. What is your bucket volume?

5-gal other _____ gal

6. How long did it take to fill the bucket?

22.33 sec ÷ 60 sec = 0.37 min

7. Calculate your water flowrate

5 gal ÷ 0.37 min = 13.5 gal/min

OR, if using a **water flow meter**, write in your reading _____ gal/min

8. If you are testing a dirty filter, what was the improvement in water flow rate after changing to a clean filter?

Flow rate measured with the dirty filter _____ gal/min

Flow rate after installing a clean filter _____ gal/min

Flow rate improvement by changing filters _____ gal/min

9. If you are testing two hose bibs or valves, what was the improvement in water flow rate after changing valves?

Flow rate measured with installed hose bib/valve _____ gal/min

Flow rate after change to new hose bib/valve _____ gal/min

Flow rate improvement by changing hose bib/valves _____ gal/min

10. What water sources are running while you do the test?

House 1 water manifold is the only system running.

Notes: The medicator is rated at 11 gpm, 13.5 gpm is sufficient to supply the medicator.

Water Flow Rate Worksheet

Make sure you have the main water shut-off valve and any additional valves in the pipe circuit fully open to prevent the restriction of water pressure and flow during this test.

Flow Rate Location: _____ Date of Evaluation: _____

Person Evaluating: _____

Test Information

1. What method are you using to test? Bucket method Water flow meter
2. What is the size of your PVC piping? 3/4-in PVC 1-in PVC
3. What are you testing? dirty filter hose bib ball valve open pipe/hose
4. What are you using to time your fill rate? stopwatch timer smartphone

5. What is your bucket volume? 5-gal other _____ gal

6. How long did it take to fill the bucket? _____ sec ÷ 60 sec = _____ min

7. Calculate your water flowrate _____ gal ÷ _____ min = _____ gal/min

OR, if using a **water flow meter**, write in your reading _____ gal/min

8. If you are testing a dirty filter, what was the improvement in water flow rate after changing to a clean filter?

Flow rate measured with the dirty filter _____ gal/min

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