

How to determine physical properties of a container media

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A list of things you will need:

An instrument to measure the volume of water: graduated cylinder or some form of measuring cup

Scale for weighing

Aluminum pie plate

A saucer - these are commonly sold for putting under house plants, you can get them at any garden center.



1. The first step is to determine the volume of your container. Do this by plugging the holes and filling the container with water up to the line that you would normally fill with media. Record this volume on the [worksheet](#) on line **A**.

Tip: you can use duct tape to seal the holes on a normal container, however, this a lot harder than you would think (trust me!!). Call your container supplier and ask for a couple of containers without holes. They should be able to accommodate you. Use these containers to determine the volume by filling with water.



2. Fill the container with a relatively moist media so that it easily accepts water. Fill to the same level you would normally fill the container, and firm the media similar to when potting.



Tip: Ask your container manufacturer for some containers without holes. On the bottom, drill a 3/4 inch hole and plug it with a rubber or cork stopper.



3. Add water to the media slowly. Fill water until you can see the top of the container glisten. Tap the sides of the container slightly to allow air bubbles to escape. The objective of this step is to fill every pore space with water.

Tip: Use your finished media with all the components mixed, including fertilizers. Take your time with this step to ensure that the entire pore space is filled with water.

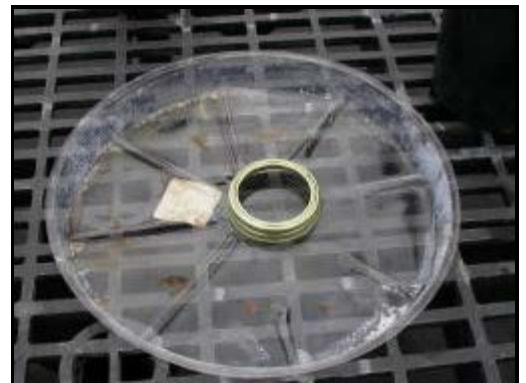


4. Carefully remove the plug from the container bottom. DO NOT tilt the container, try to hold it as level as possible. Use a large pan to collect all the water that drains from the container. Allow 10 to 15 minutes for adequate drainage. Record the volume of water that drains from the container on line **B** of the [worksheet](#).

Note: Every milliliter of water that drains from the container must be filled with the same volume of air. So by recording the volume of water that drains, we can determine the container volume filled with air, and hence Air Space.



Tip: Use the lid to a canning jar to hold the container off the saucer until it fully drains. Another option is to cut 3" diameter pvc pipe into rings. These rings also come in handy when conducting pour-thru tests used in monitoring container nutrition.



5. Dump the entire contents of the container into an aluminum pie pan. Weigh the pan and record the weight in grams on line **C** of the [worksheet](#).

Put the pan in an oven or allow to dry in a warm greenhouse for several days. Dry the bark until it is completely dry.

Tip: Using an aluminum pie pan like this will require at least 3 pans for a 1 gallon container.



6. When completely dry, weigh the pan again (in grams) and record the value on line **D** of the [worksheet](#).

Note: 1 milliliter of water weighs exactly 1 gram, in other words: $1 \text{ g H}_2\text{O} = 1 \text{ ml H}_2\text{O}$. By weighing the amount of water that is dried off the media, we know the volume of water held by the media. This volume is the Water Holding Capacity.

7. Use the instructions on the worksheet to perform any unit conversions, and to determine the physical properties of your media.

Worksheet for calculating physical properties of a container media

Note: record all units in milliliters or grams, as indicated for each entry. If you need to convert to these units from pounds and/or ounces, use the conversion table at the bottom of this page.

- A. Record the volume of the container. _____ ml
- B. Volume of water that drains from the container _____ ml
- C. Record the weight of the media prior to placing in the oven _____ g
- D. Weight of media after removing from the oven _____ g

$$\text{Air Space} = B \div A$$

$$\text{Water Holding Capacity} = (C - D) \div A$$

$$\text{Total Porosity} = \text{Air Space} + \text{Water Holding Capacity}$$

Example

- A. Record the volume of the container. _____ 2960 _____ ml
- B. Volume of water that drains from the container after _____ 800 _____ ml
- C. Record the weight of the media prior to placing in the oven _____ 2400 _____ g
- D. Weight of media after removing from the oven _____ 900 _____ g

$$\text{Air Space} = 800 \div 2960 = 0.27 = 27\%$$

$$\text{Water Holding Capacity} = (2400 - 900) \div 2960 = 0.506 = 51\%$$

$$\text{Total Porosity} = 27\% + 51\% = 78\%$$

Conversions

<u>If you have</u>	<u>Multiply by</u>	<u>To get</u>
gallons	3785	ml
ounces (fluid)	29.57	ml
pounds	454	grams
ounces (weight)	28.4	grams