



The Purple Foot

Hydrometer Instructions #1

(The Specific Gravity Scale and Alcohol Potential)

The Hydrometer is probably one of the most useful tools for the home wine maker or beer maker. It is an inexpensive tool that gives the home wine or beer maker a lot of important information. Many people find the idea of reading a hydrometer a daunting task because they read a lot of information that makes it seem very complicated. The fact is, for a beginner at least, it doesn't need to be that complicated. Does it matter to you if you have 12% or 12.5% alcohol in your finished wine? Most people would say "close enough"! We don't need to hit a bull's eye; we just want to hit the board.

What is a Hydrometer?

To the home fermenter it is a tool that gives us basic information about the fermentation process. It is glass, so be careful when using it.

Helps us to monitor the progress of our fermentation

Helps us to calculate and control the alcohol percentage of our wine or beer

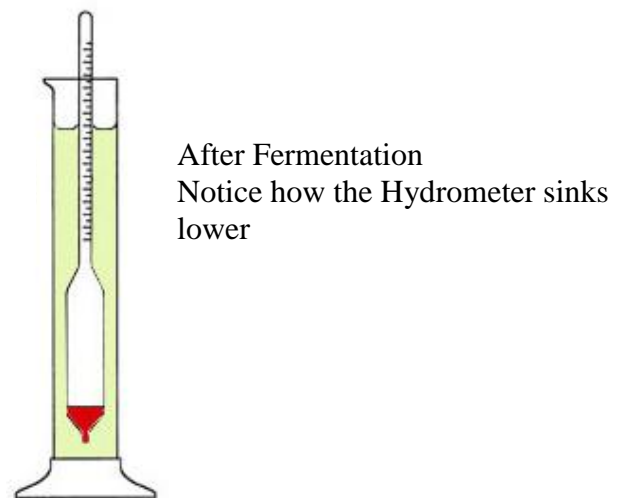
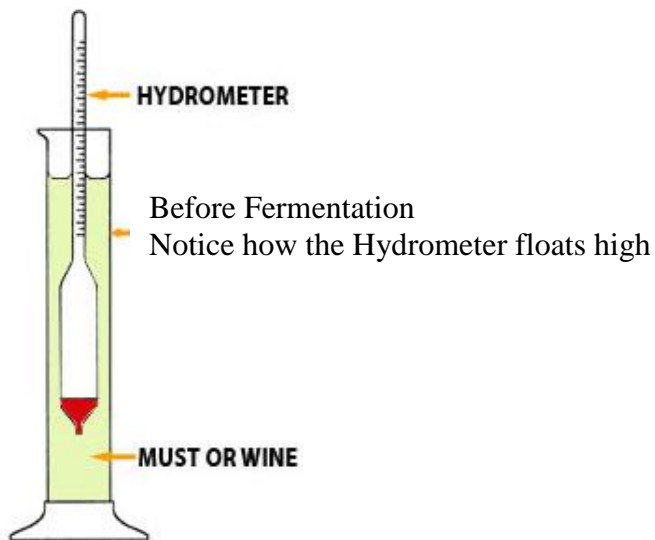
Helps us to determine our finished sweetness level

What does it measure?

The Hydrometer measures the sugar present in the wine (must) or beer (wort) sample. As the yeast consumes the sugar and converts it to alcohol the hydrometer reading comes down.

How does the hydrometer work?

The Hydrometer measures the density (Specific Gravity) of the liquid it is floating in. Sugar and water are denser than alcohol. As the yeast consumes the sugar and turns it into alcohol the Hydrometer sinks lower in the liquid. Most Hydrometers have 3 scales, for now focus on the Specific Gravity Scale only.



Why is it important?

The Hydrometer helps you monitor the progress of the fermentation. If you have a problem with your fermentation, we can help you, but we need to understand the progression of your wine in order to give good advice. The Hydrometer gives us some of that information.



Reading the Hydrometer

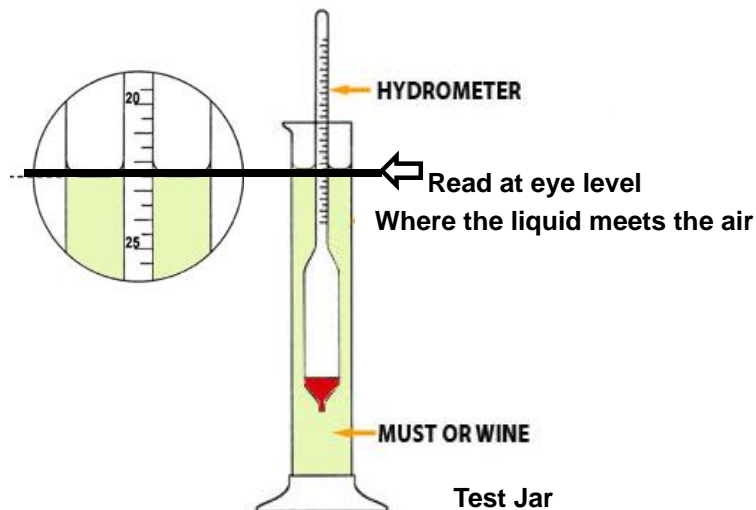
(It's close enough for a beginner)

If you are a beginner, use these basic steps to read a Hydrometer. Accuracy is not the goal at this point, learning how to use this tool to monitor the process is. Don't worry about the temperature or reading at the meniscus like some other information you may have read. Accuracy will come later as your skills progress.

Reading the Specific Gravity Scale

First try reading the Hydrometer using only water in the test jar. This will tell you if your Hydrometer is calibrated and it gives you practice reading it. The Specific Gravity of water is 1.000.

1. Sanitize the Hydrometer, the test jar and the wine thief
2. Gently place the Hydrometer into the test jar (Carefully so you don't break the Hydrometer)
3. Draw a sample of the wine or beer to be tested and fill the test jar until the Hydrometer floats.
4. Place the Hydrometer Jar on a level surface
5. Spin the Hydrometer to shake loose any bubbles which could give a false reading
6. At eye level look at the Specific Gravity scale on the hydrometer stem where the liquid meets the air and "slices" through the Hydrometer.
7. Write the reading down on your log.



When should you take the readings?

1. The first readings are taken while mixing the wine (must) or beer (wort) to ensure there is enough sugar present to achieve the desired alcohol level. Make a note of the Specific Gravity before the yeast is added in your log. This number is our starting point and is needed to determine the alcohol percentage of the finished wine or beer.

Tip: If you are fermenting beer or wine from juice, leave the hydrometer floating in the primary so you can take the next 2 readings without drawing samples. Do not do this if you are fermenting fruit.

2. The second reading is done a couple of days after adding the yeast, this reading tells us whether or not fermentation is progressing. The reading should be a little lower.
3. The third reading is used to determine when to move the wine (must) or beer (wort) into the secondary fermenter (glass carboy). Check every couple of days.
4. The fourth reading is taken 2-3 weeks after fermentation has begun to determine whether or not the fermentation has completed.
5. A fifth reading is done for wine after sweetening to determine the level of sweetness.

How do I know what my alcohol percentage will be?

I will address this more on the next pages.



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Hydrometer Instructions #2

(A little more advanced)

Once you feel comfortable taking Specific Gravity Hydrometer readings as part of your routine continue reading the notes below.

Hydrometer Scales

There are many different types of hydrometers; some only have one scale, some two and others three. The three measurements a winemaker requires from a hydrometer are: Specific Gravity (SG), sugar (Brix or Balling) and Potential Alcohol.

The SG scale usually reads from 0.990 to 1.120. The S.G. of water is 1.000, therefore if you float your hydrometer in water (as described above); the surface should rest at the 1.000 mark. As you dissolve sugar in the water, the hydrometer will float higher.

Finished Range Hydrometer

Hydrometers are also available with readings on the lower end of the scale. These are great for taking the final reading to accurately note the final sweetness of a finished wine.

Triple Scale

Most Hydrometers have three scales, which are:

1. Specific Gravity -----990 to 1.170
2. Balling (Brix)-----0% to 39% Sugar by weight
3. Potential Alcohol-----0% to 22% by Volume

In the beginning you will only use the Specific Gravity and the Potential Alcohol scales. Brix are referred to in some recipes or when purchasing some juices or grapes.

Specific Gravity

This scale measures how much sugar is in a liquid. The hydrometer shows a specific gravity of 1.000 when floated in pure water at 60 degrees Fahrenheit. As sugar or other soluble solids are dissolved in the water, the specific gravity will increase because adding sugar increases the density of the liquid. Temperature changes will cause variations, but these can be corrected.

Temperature Corrections		
Fahrenheit	Celsius	Add
68° F.	20° C.	.001
77° F.	25° C.	.002
86° F.	30° C.	.003

Suggested Starting Specific Gravities for:

Dry Wine - 1.075 to 1.095

Sweet Wine – It is best to make a dry wine and sweeten after the fermentation is complete.

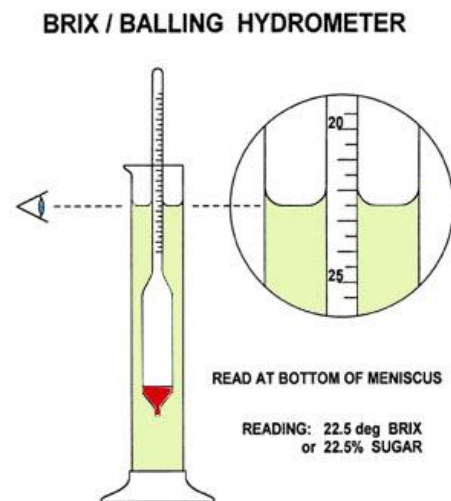
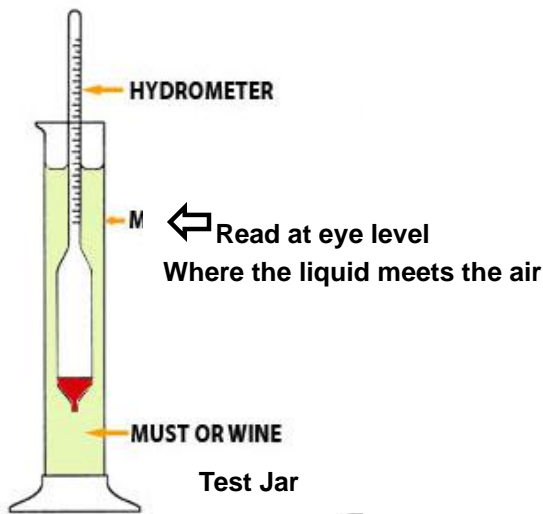
Strong Dessert Wine - 1.120 starting gravity. Then add sugar in small amounts, until fermentation stops and desired sweetness is attained, to increase the alcohol.

Example Specific Gravity Readings	Specific Gravity	
	Wine Range	Beer Range
1. Before adding the yeast.	1.050-1.100	1.050-1.070
2. 2-3 days after adding the yeast.	1.040-1.090	1.040-1.060
3. 4-7 days after adding the yeast.	1.040-1.010	1.040-1.010
4. 2-3 weeks after adding the yeast.	0.997 or Less	1.010 or Less
5. Final Sweetness	1.000-1.030 +	

How to Read Your Hydrometer

1. Sterilize your Hydrometer, Test Jar and wine thief.
2. Insert the Hydrometer into the jar. (Carefully so you don't break the Hydrometer)
3. Fill the Test Jar with the "must" – use a wine thief or bulb baster to draw a sample.
4. Place the Test Jar on a level surface.
5. Spin the Hydrometer in the jar to dislodge any air bubbles. When the hydrometer stops spinning it will float at a certain level on the stem. Take care that the hydrometer is floating freely and not leaning against the jar.
6. At eye level look at the Specific Gravity scale on the hydrometer stem where the liquid meets the air and "slices" through the Hydrometer.
7. Note the Specific Gravity Scale – write this number down.
8. Turn to the Potential Alcohol Scale and note this number. This will indicate the POTENTIAL Alcohol of the must. The potential is reached when the sugar is converted to alcohol.

Always double check your readings and calculations for accuracy. For home fermentation it's not critical to be exact; however you don't want to be too far off either.



To Raise the Specific Gravity/Potential Alcohol

If there is not enough sugar in the fruit to create the amount of Alcohol needed for the type of wine you wish to make, adjust by calculating the needed amount and adding more sugar.

4 ounces of sugar added to 1 gallon of "must" will raise the reading by 10 points. (1.060 to 1.070)

To Decrease the Specific Gravity/Potential Alcohol

If you have too much sugar, add more water or juice until you reach the desired amount..

Potential Alcohol

This scale refers to the percentage of alcohol that will be produced if all the sugars present are converted. If, for any reason, fermentation stops before all the sugar is converted, the potential alcohol will not be attained.

The alcohol content of your finished wine or beer can be calculated using the Hydrometer readings. In order to calculate your alcohol you will need to take 2 readings

1. The first reading must be taken **before** the yeast is added to the juice (must) or the brew (wort).
2. The second reading is taken **after** fermentation is completed, but before a wine is sweetened.

To determine the alcohol content of a wine or beer subtract the last reading from the first reading.

For example:

Starting potential alcohol is 14% and final is 1%.

$14\% - 1\% = 13\%$ actual alcohol

Starting potential alcohol is 12% and final is -1%

$12\% + 1\% = 13\%$ actual alcohol (the 1% is added)

ABV% Calculator

You can also calculate your Alcohol By Volume using this calculation

Original Gravity (OG): Specific Gravity reading before adding the yeast

Final Gravity (FG): Specific Gravity reading after fermentation is completed.

$(OG-FG) \times 131.25 = ABV\%$

(_____ - _____) x 131.25 = ____% ABV

Beer Examples:

$1.050 - 1.010 \times 131.25 = 5.25\%$

$1.060 - 1.010 \times 131.25 = 6.56\%$

Wine Examples:

$1.090 - 1.000 \times 131.25 = 11.81\%$

$1.090 - 0.990 \times 131.25 = 13.12\%$