EZ Water Calculator Spreadsheet 3.0

Step 1: Enter Starting Water Profile

A. Profile

	Calcium (Ca ppm)	Magnesium (Mg ppm)	Sodium (Na ppm)	Chloride (Cl ppm)	Sulfate (SO_4 ppm)	Bicarbonate (HCO_3 ppm) / Alkalinity ($CaCO_3$ ppm)
Starting Water Profile: (ppm = mg/L)	4	0	7	7	0	12 (Alkalinity selected)

If your water report gives Sulfate as Sulfur (SO_4-S) such as a Ward Lab's report, multiply by that by 3 to get SO_4

B. Volume

	Mash Water	Sparge Water
Volume (gallons):	5	3.25
% that is Distilled or RO:	0%	0%

Step 2: Enter Grain Info

Crystal Malt: *Caramel malts, Cara Munich, Cara Aroma, etc.*

Roasted/Toasted Malt: *Roasted Barley, Black Patent, Carafa, etc.*

Acidulated Malt: *Enter in Step 4a.*

Select Grain Type	Weight (lb)	Color (°L) (Crystal Malts Only)	Distilled water Mash pH (from chart)
Base - Maris Otte	5		5.77
Crystal Malt	0.75	60	4.92
Crystal Malt	0.5	120	4.62
Roasted/Toasted	0.5		4.71
- Select Grain -	0		0.00
- Select Grain -	0		0.00
- Select Grain -	0		0.00
- Select Grain -	0		0.00
- Select Grain -	0		0.00
Total Grain Weight (lb):	*6.75*		
Mash Thickness:	*2.96 qt/lb*		

	grain types	dist water pH
1	- Select Grain -	
2	Base - 2-Row	5.70
3	Base - 6-Row	5.79
4	Base - Maris Otte	5.77
5	Base - Munich	5.43
6	Base - Pilsner	5.75
7	Base - Wheat	6.04
8	Base - Vienna	5.56
9	Base - Other	5.70
10	Crystal Malt	calculated
11	Roasted/Toasted	4.71

The above values are used to calculate mash pH. They may vary depending on maltser or other factors - for example Rahr 2-Row has been found to be 5.56. Modify if necessary.

Step 3: View Mash pH

Effective Alkalinity ($CaCO_3$ ppm)	Residual Alkalinity	ESTIMATED Room-Temp Mash pH	Desired Room-Temp Mash pH
153	23	**5.55**	*5.4 - 5.6*

Note: When measuring actual mash pH with a meter, keep in mind that it can take up to 15 minutes for mash pH to stabilize.

There are varying opinions on the optimum range here. Consider doing your own research and/or experimentation to determine what's best for you.

Step 4a: Adjust Mash pH DOWN (if needed)

	Gypsum $CaSO_4$	Calc. Chloride $CaCl_2$	Epsom Salt $MgSO_4$
add at dough-in or prior. Mash Water Additions (grams):	1	6	4
Adjusting Sparge Water? (y/n):	☐	☐	☐
Sparge Water Additions (grams):	**0.0**	**0.0**	**0.0**

add to boil, or to sparge water prior to sparging, or combine with mash salts when treating all water combined prior to brewing.

Acidulated Malt		Lactic Acid	
acid content:	2.0%	acid content:	88%
oz:	0	ml:	0
(0% of total wt)		*Typically 2.0%. Revise if necessary.*	

Some recommend keeping this under 3%.

Step 4b: Adjust Mash pH UP (if needed)

Calculations for chalk's true affect on pH are very complex and may require an acid to fully dissolve. This spreadsheet uses half of chalk's full potential based on experimental data w/o acid addition. Results may vary.

	Slaked Lime $Ca(OH)_2$	Baking Soda $NaHCO_3$	Chalk $CaCO_3$
add at dough-in or prior. Mash Water Additions (grams):	0	2	3
Adjusting Sparge Water? (y/n):	☐	☐	☐
Sparge Water Additions (grams):	**0.0**	**0.0**	**0.0**

add to boil, or to sparge water prior to sparging, or combine with mash salts when treating all water combined prior to brewing.

Step 5: View Resulting Water Profile

	Calcium (Ca ppm)	Magnesium (Mg ppm)	Sodium (Na ppm)	Chloride (Cl ppm)	Sulfate (SO_4 ppm)	Chloride / Sulfate Ratio
Mash Water Profile:	166	20	36	160	112	1.43
Mash + Sparge Water Profile:	**102**	**12**	**25**	**100**	**68**	**1.47**
Palmer's Recommended Ranges:	*50 - 150*	*10 - 30*	*0 - 150*	*0 - 250*	*50 - 350*	*Above 1.3 may enhance maltiness*

There are varying opinions on these ranges. Consider doing your own research and/or experimentation to determine what's best for you.

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References:

Portions of the Alkalinity, RA, and pH calculations are based on information and experiments from:
Kai Troester, "The effect of brewing water and grist composition on the pH of the mash" 2009
Recommended mineral ranges are from:
John Palmer, "How to Brew"
Recommended Cl to SO4 ratio ranges are from:
John Palmer's RA spreadsheet

Created by: TH

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