

Step 1: Enter Starting Water Profile

A. Profile		Calcium (Ca ppm)	Magnesium (Mg ppm)	Sodium (Na ppm)	Chloride (Cl ppm)	Sulfate (SO ₄ ppm)	<input type="radio"/> Bicarbonate (HCO ₃ ppm) <input checked="" type="radio"/> Alkalinity (CaCO ₃ ppm)
Starting Water Profile: (ppm = mg/L)		18	10	36	109	10	49

If your water report gives Sulfate as Sulfur (SO₄-S) such as a Ward Lab's report, multiply by that by 3 to get SO₄

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

Step 2: Enter Grain Info

	Select Grain	Weight	Color (°L)	Distilled water	grain types	dist water pH
	Type	(lb)	(Crystal Malts Only)	Mash pH (from chart)		
Crystal Malt: Caramel malts, Cara Munich, Cara Aroma, etc.	Base - 2-Row	9.5		5.70	1 - Select Grain -	
	Base - Wheat	1		6.04	2 Base - 2-Row	5.70
	Base - Other	2		5.70	3 Base - 6-Row	5.79
Roasted/Toasted Malt: Roasted Barley, Black Patent, Carafo, etc.	- Select Grain -	0		0.00	4 Base - Maris Otte	5.77
	- Select Grain -	0		0.00	5 Base - Munich	5.43
	- Select Grain -	0		0.00	6 Base - Pilsner	5.75
Acidulated Malt: Enter in Step 4a.	- Select Grain -	0		0.00	7 Base - Wheat	6.04
	- Select Grain -	0		0.00	8 Base - Vienna	5.56
	- Select Grain -	0		0.00	9 Base - Other	5.70
	- Select Grain -	0		0.00	10 Crystal Malt	calculated
	- Select Grain -	0		0.00	11 Roasted/Toasted	4.71
Total Grain Weight (lb):		12.5				
Mash Thickness:		1.6 qt/lb				

The above values are used to calculate mash pH. They may vary depending on malter 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
-230	-308	5.38	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	Acidulated Malt	Lactic Acid
<i>add at dough-in or prior.</i>				acid content: 2.0%	acid content: 88%
Mash Water Additions (grams):	4.5	2	0	oz: 0	ml: 4.5
Adjusting Sparge Water? (y/n):	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(0% of total wt)	Typically 2.0%. Revise if necessary.
Sparge Water Additions (grams):	2.9	0.0	0.0	Some recommend keeping this under 3%.	

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

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

	Slaked Lime Ca(OH) ₂	Baking Soda NaHCO ₃	Chalk CaCO ₃
<i>add at dough-in or prior.</i>			
Mash Water Additions (grams):	0	0	0
Adjusting Sparge Water? (y/n):	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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.

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.

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:	101	10	36	160	143	1.12
Mash + Sparge Water Profile:	89	10	36	140	143	0.98
Palmer's Recommended Ranges:	50 - 150	10 - 30	0 - 150	0 - 250	50 - 350	.77 to 1.3 = Balanced