05 SMaSH Centennial

Step 1: Enter Starting Water 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)
A. Profile						
Starting Water Profile: (ppm = mg/L)	41	9	67	71	44	178

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 (liters):	3,6	4
(gallons):	*0,95*	*1,06*
% 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 (kg)	Color (°L) (Crystal Malts Only)	*Distilled water Mash pH (from chart)*
Base - Maris Otte	1,2		*5,77*
- 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*
- Select Grain -	0		*0,00*
- Select Grain -	0		*0,00*
- Select Grain -	0		*0,00*
Total Grain Weight (kg):	***1,2***		
(lbs):	*2,6*		
Mash Thickness:	***3 l/kg***		
	1,44 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

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.

Effective Alkalinity ($CaCO_3$ ppm)	Residual Alkalinity	**ESTIMATED Room-Temp Mash pH**	*Desired Room-Temp Mash pH*
-91	-237	**5,52**	***5.4 - 5.6***

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):	0	1,81	0,85
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	
acid content:	2,0%
grams:	0
oz:	*0,0*
(0% of total wt)	

Typically 2.0%. Revise if necessary.

Lactic Acid	
acid content:	80%
ml:	0,8

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	0	0
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:	178	31	67	314	136	2,31
Mash + Sparge Water Profile:	**106**	**19**	**67**	**186**	**88**	**2,12**
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.